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the OIL AND GAS JOURNAL

7 Reasons WHY IT'S WARREN

1. PERSONNEL
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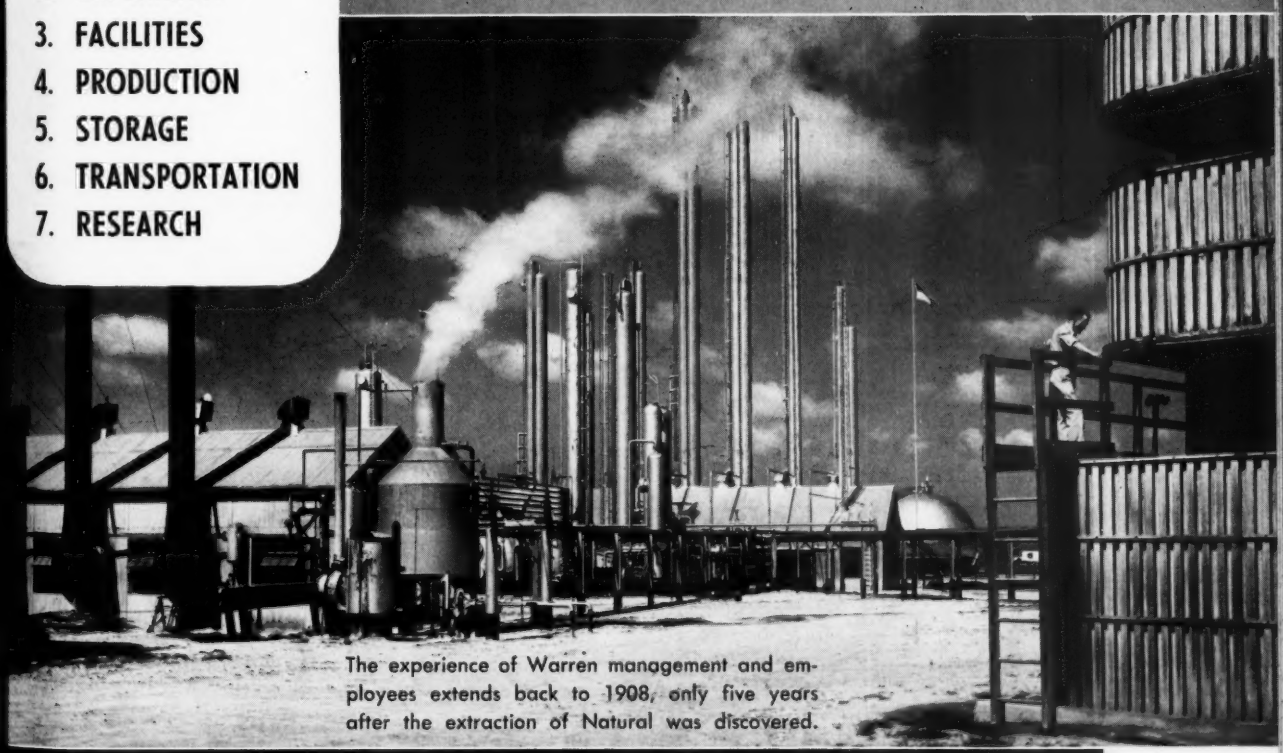


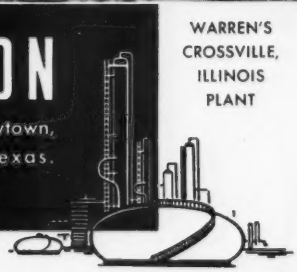
The experience of Warren management and employees extends back to 1908, only five years after the extraction of Natural was discovered.

WARREN PETROLEUM CORPORATION

Producers, Manufacturers, Exporters and Marketers

Export Terminals: Corpus Christi, Port Arthur, Baytown, Texas City, and Norsworthy, Houston, Texas.

TULSA 2, OKLAHOMA CABLE ADDRESSES: Stavolene, Warren



WARREN'S CROSSVILLE, ILLINOIS PLANT

Crude Oil, Natural Gasoline and Liquefied Petroleum Products

PRICE 50 CENTS TABLE OF CONTENTS PAGE 67 FEBRUARY 17, 1949

XUM

Excerpt from Lane-Wells operator's report:

"In this field, most of the production comes from the Arbuckle dolomite, often from very thin zones. Measurements only slightly in error can, therefore, cause serious difficulty, especially as some of the porous zones in the Arbuckle contain nothing but water.

"We ran a Combination Radioactivity Log, with a Collar Log, to define the stratigraphy and locate it accurately in reference to the collars. The log showed three porous zones in the Arbuckle, the lower one known to be water-bearing. The second zone was gun-perforated and squeezed for water shutoff. We perforated the top zone from collars, for production. IP was 1341 BOPD."

LANE WELLS COMPANY

TECHNICAL OILFIELD SERVICES

Radioactivity Well Logging.... hit the pay zones on the nose!

LOS ANGELES • HOUSTON • OKLAHOMA CI

GENERAL OFFICES, EXPORT OFFICES & PLANT — 5610 SO. SOTO ST., LOS ANGELES 11

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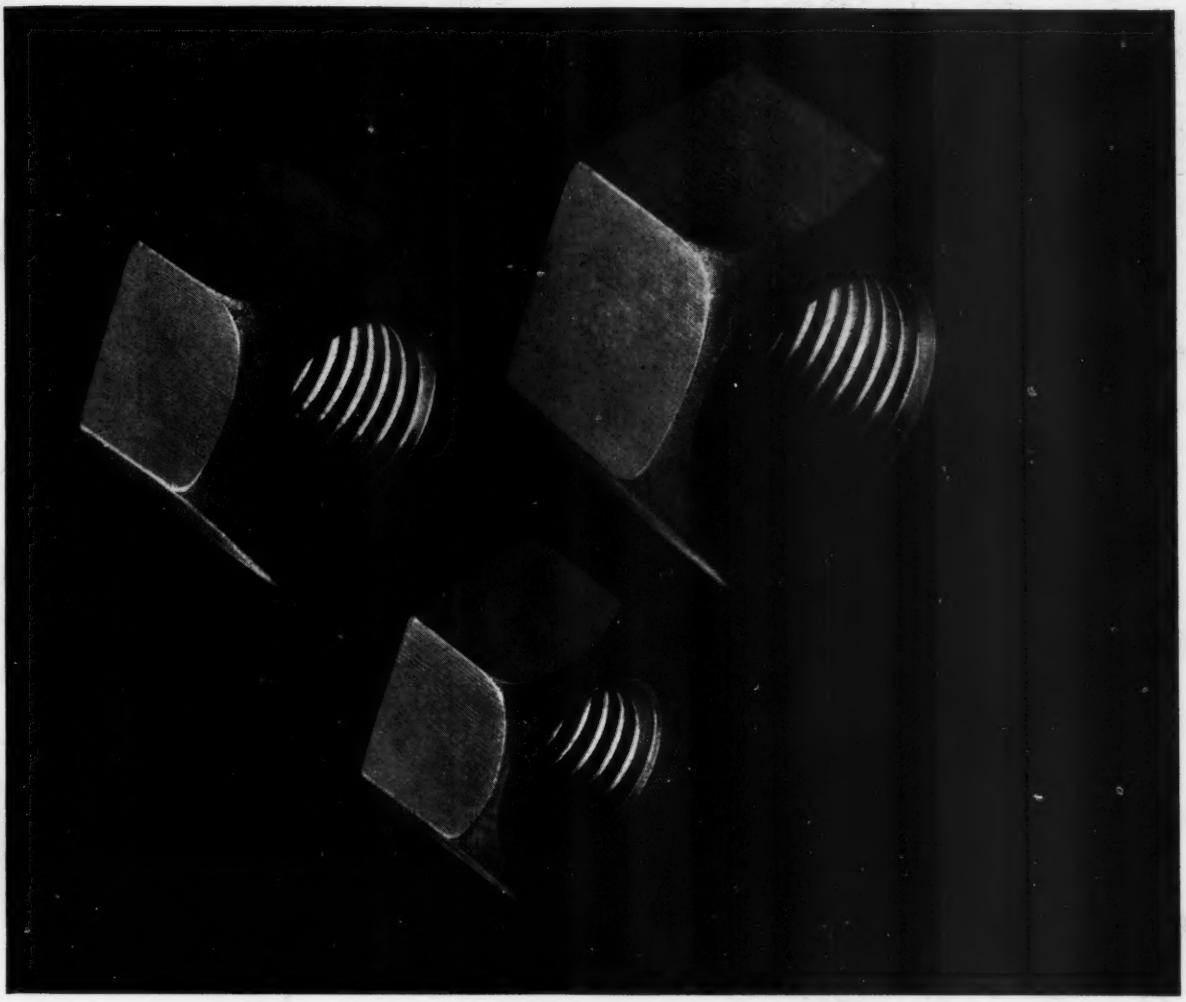

Use This Superior Nut For High-Temperature Bolting

THE BETHLEHEM QUENCHED NUT IS A PRODUCT OF BETHLEHEM'S LEBANON, PA., PLANT

Want a nut that can take it? One that you can count on for long, dependable service in high-temperature bolting? The Bethlehem Quenched Nut is your answer.

The Bethlehem Quenched Nut is ideal for the more difficult bolting jobs in refineries because it is both hot-forged and quenched, and thus has the hardness and ductility to meet severe temperature conditions. As for strength, it is sufficiently strong to break any stud or bolt on which it is used. It also has uniform, well-formed threads, and its oxidized sides offer increased corrosion resistance.

The Bethlehem Quenched Nut comes in all bolt sizes from ⅜ in. to 3½ in., inclusive, and fully meets ASTM Specifications for a Grade 2H nut. It's well worth investigating.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation

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Bethlehem supplies every type of Fastening

BETHLEHEM STEEL

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Wherever oil is found, Black, Sivalls & Bryson is nearby with quality products and superior service. For over 55 years, B S & B has contributed its great steel plants, research laboratories and widespread corps of field servicemen to the advancement of the industry. Today, a full line of proven oil field equipment and repair and replacement parts are as near as your telephone. A request on your company letterhead will bring you a copy of the latest B S & B Complete Catalog . . . over 300 pages, profusely illustrated with diagrammatic drawings in color, photographs, data charts. Address the Executive Offices, Black, Sivalls & Bryson, Inc., Power and Light Building, Kansas City 6, Missouri.

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VALVES
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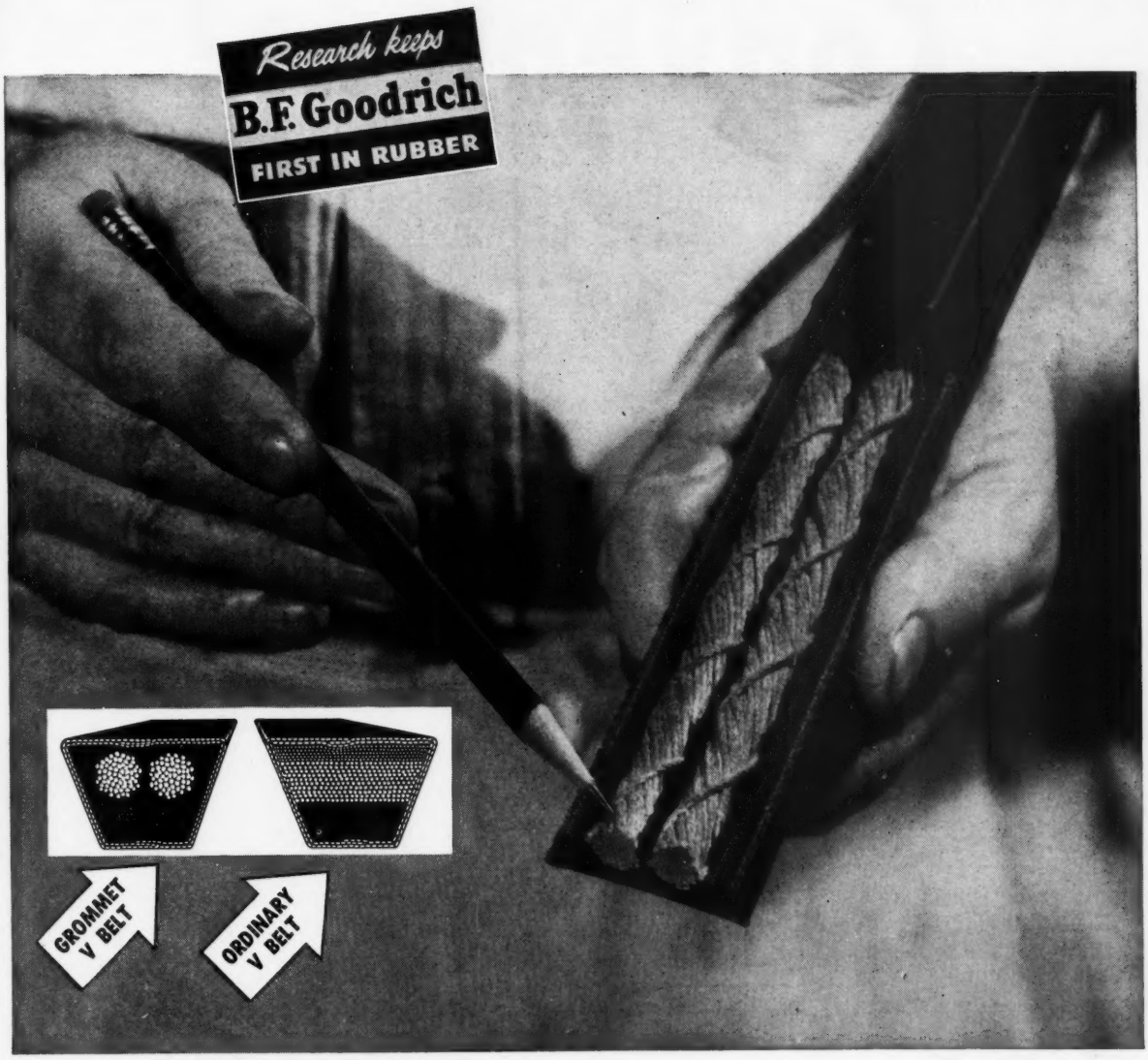

This V belt will cut your belt costs 20% to 50%

Only B.F.Goodrich makes the grommet belt—there's no other like it

THE B.F.Goodrich patented grommet belt lasts 20 to 50 per cent longer but costs no more than an ordinary V belt.

A grommet is *not a cable.* It is made by winding heavy cord *on itself* in an endless loop. (Cables are simply twisted cords; ends must be overlapped or spliced.)

Better than multiple cords. In a grommet belt all the cords work *all the time.* There are no cords in the *center* of the belt — which in an ordinary belt don't pull their share of the load.

More flexible. There is no splice, no stiff section where cords overlap. (85% of failures of ordinary belts occur in overlapped sections.) BFG belts have twin grommets, no fabric or plies in the middle of the belt that stiffen it and generate heat.

Stand shocks. Grommet belts run cooler, are stronger, have more *elasticity* but less *permanent* stretch than any other kind of belt. They stand sudden shock. Both laboratory and field tests have proved that they outlast all others, especially on hard drives.

Large sizes only. At present grommet belts are made only in largest sizes (D and E sections). Later, other sizes may be made.

More information. If you buy or use large-size V belts, don't do without the advantages grommet belts can give you. Talk to your BFG distributor. Or write, if you wish, for leaflet 2170. Address Dept. L-10, *The B.F.Goodrich Company, Industrial Products Division, Akron, Ohio.*

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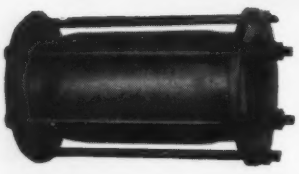
RUBBER FOR INDUSTRY

Convenient!

you can buy these products through these Companies

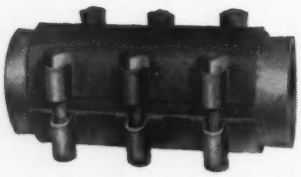


DRESSER LONG SLEEVES

(Style 40) simplify pipe joining. Span gaps between pipe ends. No threading, exact fitting or aligning. Ideal joint at wells, separators, pumps, engines and tanks.

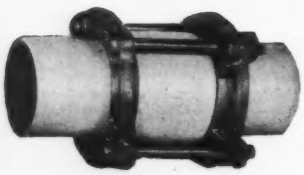
DRESSER COUPLINGS

(Style 38) speed laying of field, gathering and transmission lines; save time on hookups; absorb vibration at pumps, engines and compressors. 100% salvageable in relocating temporary lines.



DRESSER SPLIT REPAIR CLAMPS

(Style 79B) for quick repair of pitholes and longitudinal splits in pipe. Furnished with either one or two shells—an inexpensive "bandage" which saves cutting out short sections of damaged pipe.



DRESSER COLLAR CLAMPS

(Style 4,41) stop leaks through threads of screw collars, without service interruption. Band Clamps (Style 77B), Porous Weld Clamps (Style 55), and other pipe repair devices also available.

(Partial List)

Alamo Iron Works
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American Supply Co.
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Always within "hollering distance"

at your nearest oil field supply store or our Houston Warehouse, Dresser products save installation time and give you *reliable* connections and repairs.

DRESSER COUPLINGS and Repair Products

Dresser Manufacturing Division (One of the Dresser Industries), 59 Fisher Ave., Bradford, Pa. • Houston Office & Warehouse: 1121 Rothwell Street, Houston, Texas. • Sales Offices: New York, Chicago, Houston, San Francisco.

Everything in Refinery Piping ...on one order to CRANE

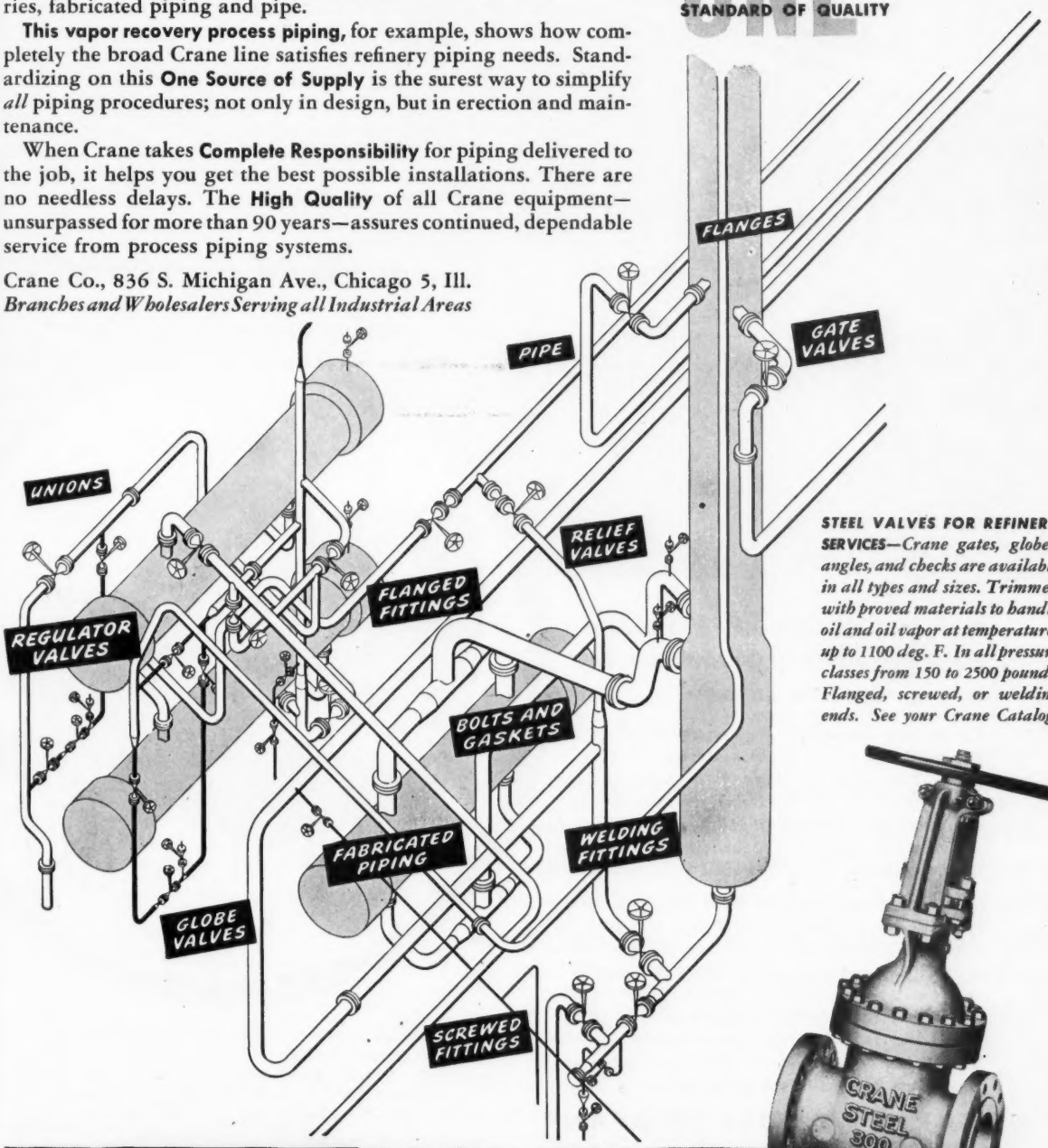
There is no better way to order piping equipment. One catalog offers you the world's most complete line of brass, iron, steel and corrosion-resistant alloy materials. One order to your local Crane Branch or wholesaler covers everything—valves, fittings, accessories, fabricated piping and pipe.

This vapor recovery process piping, for example, shows how completely the broad Crane line satisfies refinery piping needs. Standardizing on this **One Source of Supply** is the surest way to simplify *all* piping procedures; not only in design, but in erection and maintenance.

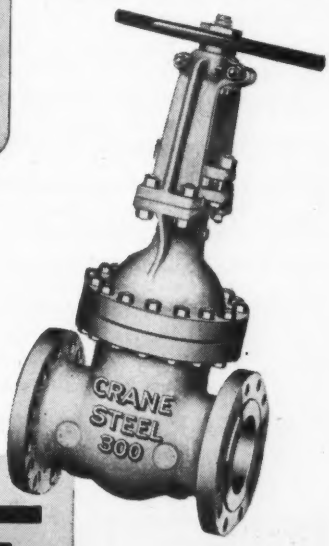
When Crane takes **Complete Responsibility** for piping delivered to the job, it helps you get the best possible installations. There are no needless delays. The **High Quality** of all Crane equipment—unsurpassed for more than 90 years—assures continued, dependable service from process piping systems.

Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Branches and Wholesalers Serving all Industrial Areas

ONE
SOURCE OF SUPPLY
RESPONSIBILITY
STANDARD OF QUALITY



STEEL VALVES FOR REFINERY SERVICES—*Crane gates, globes, angles, and checks are available in all types and sizes. Trimmed with proved materials to handle oil and oil vapor at temperatures up to 1100 deg. F. In all pressure classes from 150 to 2500 pounds. Flanged, screwed, or welding ends. See your Crane Catalog.*



EVERYTHING FROM . . .

VALVES · FITTINGS
PIPE · PLUMBING
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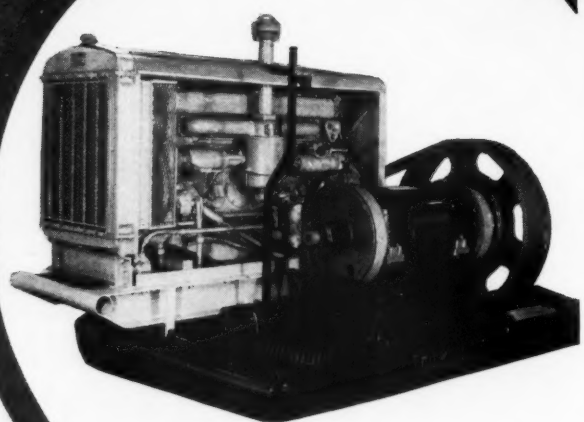
CRANE

FOR EVERY PIPING SYSTEM

Where dependabilty is a *must...*

MURPHY DIESEL POWER



Murphy Selected for First Diesel Powered Drilling Operations in Eastern Canada

Up in New Brunswick where complete power dependability is a must, New Brunswick Oilfields, Ltd., selected Murphy to power their Well No. 121 in Albert County. Particularly significant in the selection of Murphy Power is the fact that this installation is believed to be the first diesel powered drilling operation in eastern Canada.

Wherever Murphy Diesels are used they establish enviable records for dependability. Offering such outstanding design features as "true" diesel operation . . . unit fuel injection . . . four valves per cylinder . . . dual overhead camshafts . . . flywheel end cam drive . . . and hydraulic servo-type governor, the Murphy Diesel delivers more power continuously at lower cost. The booklet *"7 Questions to Ask a Diesel Engine Salesman"* gives full details; ask for a copy.

MURPHY DIESEL COMPANY
5305 W. Burnham St. • Milwaukee 14, Wis.

The large illustration above shows the location of New Brunswick Oilfields Well No. 121. In the inset is the "Oilwell" cable tool drilling unit powered by a Murphy Diesel Model ME-66. This engine is rated at 150 H.P. continuous, 180 H.P. intermittent.

LOWEST ULTIMATE POWER COST

FACTORY BRANCH—SALES, PARTS and SERVICE
113-17 SOUTH ELWOOD STREET, TULSA, OKLAHOMA

MURPHY DIESEL

HAVE A PROBLEM?

Bovaird has the Answer!

SUPPLY BOVAIRD COMPANY

OFFICES AND STORES

ILLINOIS—Clay City, Grayville, Salem
KANSAS—Chase, McPherson, Pratt, Russell, Wichita
OKLAHOMA—Duncan, Oklahoma City, Pauls Valley, Sapulpa, Seminole
TEXAS—Borger, Dallas, Odessa, Pampa

Bovaird won't drill your well for you but they will help you find a practical solution to any problem you may encounter. Bovaird's personnel is specially trained to diagnose trouble and offer suggestions which will turn problems into production. Bovaird is in business to SUPPLY your needs . . . . not to SELL you unnecessary equipment.

"Buy From Bovaird"

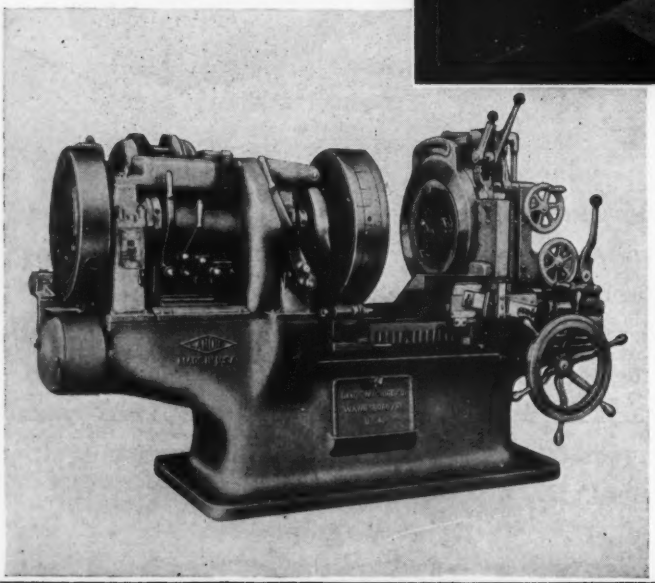
THE BOVAIRD SUPPLY CO.

GENERAL OFFICES · TULSA, OKLAHOMA

XUM

The LANDIS . .
PIPE THREADING MACHINE

THE FAMOUS THREADER OF THE OIL FIELDS



Outstanding features of Landis Receding Chaser Pipe Machines are: Adjustable taper mechanism which provides all tapers up to and including ¾", roughing and finishing cuts with the same chasers, independent adjustment of chaser holders to equalize the cut, leadscrew feed which assures perfect start and correct lead.

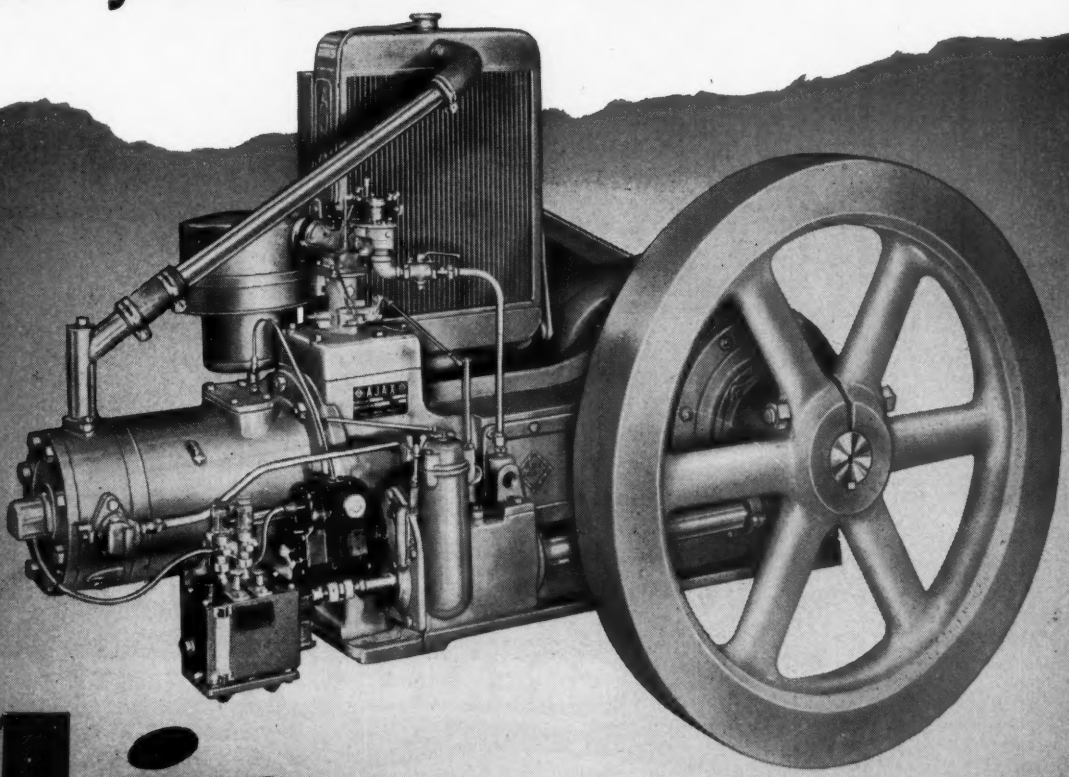
These features insure excellent thread quality and finish, high production and low operating cost.

Write for Bulletin C-77

LANDIS MACHINE CO.
WAYNESBORO, PA., U. S. A.

Represented in the Domestic Oil Fields by: Colcord-Wright Machinery & Supply Co., St. Louis, Mo.; C. J. Harter Machinery, Houston, Texas; Frederic-Baker Co., New Orleans, La.; Moore Machinery Co., Los Angeles and San Francisco, Calif.; Hendrie & Bolthoff Mfg. & Supply Co., Denver, Colo.

DEPENDABLE LOW-COST OPERATION
for your TOUGH, CONTINUOUS jobs



Ajax GAS and OIL ENGINES

- Long Life
- Low maintenance
- No oil contamination
- Double-row frictionless bearings
- Modern design

AJAX Engines are simple and sturdy. They keep on rolling month in and month out. You don't have to worry about them or baby them; they do the jobs they're built to do. • Behind such performance is the fine engineering you'd expect AJAX to apply . . . fine materials, and fine craftsmanship. *Check the details with your Supply Man!*

AJAX IRON WORKS
CORRY, PENNSYLVANIA

Oil Field Distributors: THE NATIONAL SUPPLY CO., TOLEDO, OHIO
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FOR INTRICATE OR MASSIVE HIGH PRESSURE DESIGNS

Specify TESCO STEEL CASTINGS FOR GREATER STRENGTH

Withstanding high pressures is all in the day's work for this intricate mud pump fluid end casting and this massive well head casting *because the uniform structure throughout gives these products greater strength.*

Pouring sound steel castings like these . . . for intricate or massive high pressure designs, from alloy or stainless steel . . . is all in the day's work for TESCO *because TESCO'S modern foundry equipment, experience and extensive testing and control procedures assure uniformly high quality steel castings for your products.*

Greater strength is only one of seven important advantages steel castings give you. Ask your TESCO Representative how TESCO steel castings can make your product stronger, more economical to manufacture or fabricate.

TESCO IS THE MOST EXPERIENCED FOUNDRY ON THE GULF COAST

THESE SEVEN IMPORTANT FEATURES ARE YOURS ONLY IN STEEL CASTINGS

1. **UNIFORM STRUCTURE THROUGHOUT** —for greater strength.
2. **DISTRIBUTION OF METAL**—for better weight-strength ratio.
3. **CHOICE OF MECHANICAL PROPERTIES** —to fit your specific need.
4. **GOOD MACHINABILITY**—for better designs at lower cost.
5. **DIMENSIONAL STABILITY**—for better fit, better performance.
6. **EASE OF WELDING**—for fast assembly with other parts.
7. **FATIGUE RESISTANCE**—for longer life, less replacement.

TEXAS ELECTRIC STEEL CASTING CO.

GOOD CASTINGS — CARBON AND ALLOY STEEL — HOUSTON, TEXAS

2½ years ago this advertisement told of 1,471 days of continuous service for a string of "K"* Monel sucker rods installed in a corrosive Texas well . . .

Never give corrosion an even break
. . . use SUCKER RODS of "K" Monel
When a sucker rod broke every 50 days . . .
. . . and the entire string had to be replaced every 5 months . . .
. . . operators of Arrington No. 2 well in the Howard Glasscock Field at Big Spring, Texas, made a wise move.

NOW...YOU CAN CHANGE THAT RECORD TO 2,397 DAYS!

Until November 1941, operators of Arrington No. 2 well in the Howard Glasscock Field at Big Spring, Texas, had sucker rod problems aplenty.

The advertisement shown above told about them. It told how a rod broke every 50 days. How the entire string had to be replaced every 5 months.

Then came "K" Monel

More important, though, was the story of how the situation changed after November 26, 1941. That was the date a string of ¾" "K" Monel sucker rods made by W. C. Norris Manufacturer, Inc., Tulsa, Okla., went into Arrington No. 2.

The "K" Monel string had been in continuous use for 1,471 days when E. G. Rodman, owner of the lease, said:

> *"The string of "K" Monel rods installed in 1941 was used every day—24 hours a day—in 2½" tubing with a 2¼" barrel until July 1944, when the 2½" tubing was replaced with 3" tubing and a 2¾" barrel (42" stroke—20 strokes per minute). Despite the considerable load increase . . . we have continued to use the same rods without a single break or shutdown due to rod failure. In addition, the rods appear to be as good as new."*

Over 15 times the life

Today — almost 7 years after installation — the original "K" Monel sucker rods are still on the job. They've seen 2,397 days of round-the-clock service — more than 15 times as much as rods used prior to November 1941!

Maybe "K" Monel holds the key to your sucker rod problem, too — or to some other equally troublesome equipment problem. For "K" Monel resists the corrosive action of sour crudes. It withstands stress, vibration and flow-cutting. It serves dependably even in high-velocity wells that produce sand. Heat-treated to develop its tensile strength to 145,000-170,000 psi, and its hardness to 25-35 Rockwell "C", "K" Monel brings long and improved performance to many types of oil field equipment.

There's help for you here

The full story of how you can put "K" Monel and other INCO Nickel Alloys (like Monel* and Inconel*) to work for you, is told in our new, illustrated booklet, ***Controlling Corrosion in Petroleum Production Equipment.*** Send for your copy, and get typical performance and service stories of Nickel Alloys in a variety of corrosive uses. Read a discussion of the important factors in reducing maintenance and replacement costs.

In addition to sections dealing with exploration and drilling, pumping and gas control, the booklet tells how you can get free technical advice on the selection of materials for severe service, and contains a listing of valuable Technical Bulletins that are available. Write us for your copy — now.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.
*Reg. U.S. Pat. Off.

"K"* MONEL
YOUR PARTNER IN PROGRESS

EMBLEM OF SERVICE

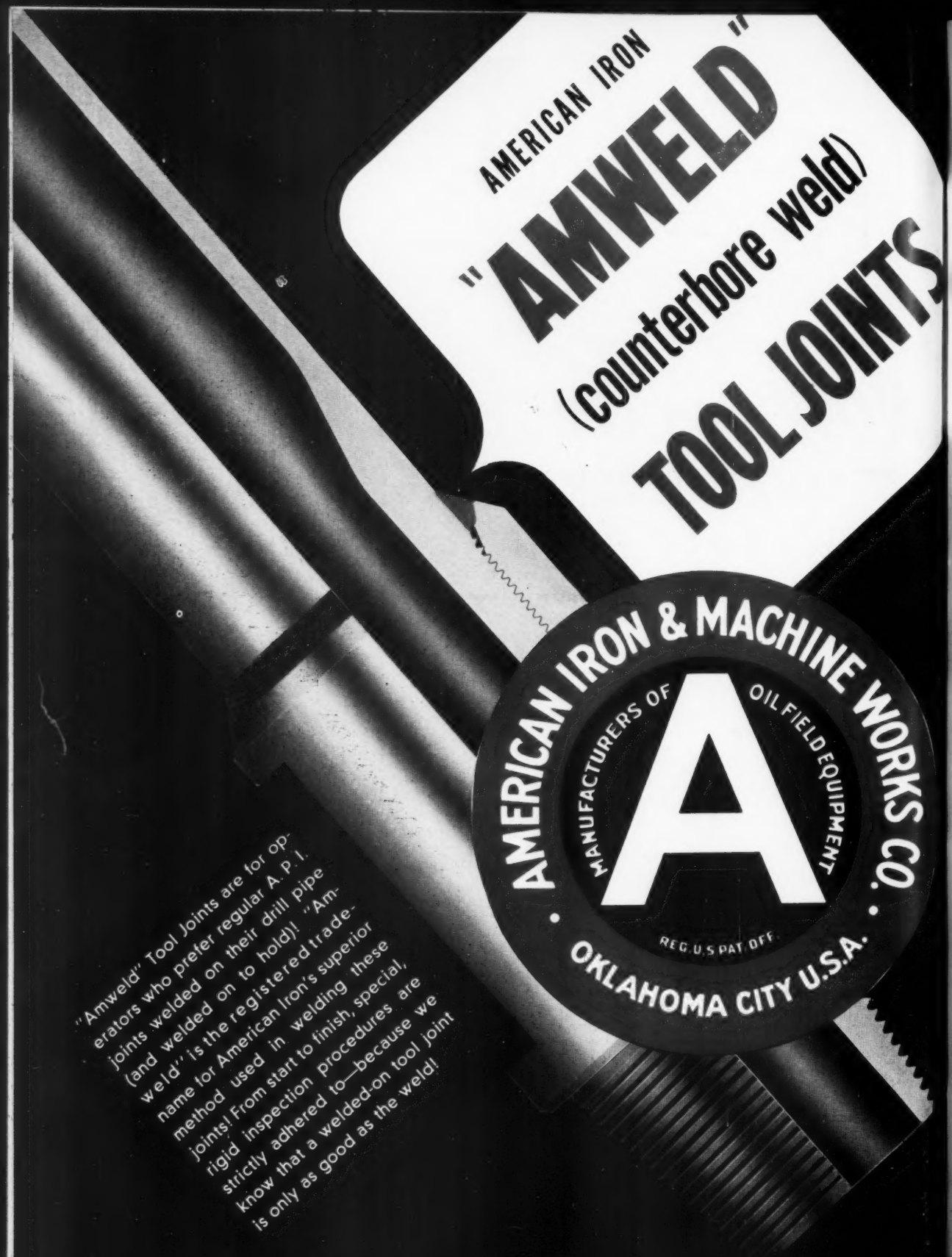
MAIL THIS COUPON TO INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Without obligation, please send me a copy of your new, illustrated booklet, ***Controlling Corrosion in Petroleum Production Equipment.***

Name..... Title.....
Company.....
Street.....
City..... Zone..... State.....

O. & G. J. 2-49


AMERICAN IRON
"AMWELD"
(counterbore weld)
TOOL JOINTS
AMERICAN IRON & MACHINE WORKS CO.
MANUFACTURERS OF
OIL FIELD EQUIPMENT
A
REG. U.S. PAT. OFF.
OKLAHOMA CITY U.S.A.
"Amweld" Tool Joints are for operators who prefer regular A. P. I. joints welded on their drill pipe (and welded on to hold)! "Amweld" is the registered trade-name for American Iron's superior method used in welding these joints! From start to finish, special, rigid inspection procedures are strictly adhered to—because we know that a welded-on tool joint is only as good as the weld!

AMERICAN IRON & MACHINE WORKS CO.

OKLAHOMA CITY, OKLAHOMA—BOX 1177—PHONE L. D. 518—DISTRICT OFFICE, HOUSTON, TEXAS

EXPORT OFFICE: 420 LEXINGTON AVE., NEW YORK CITY, N. Y.

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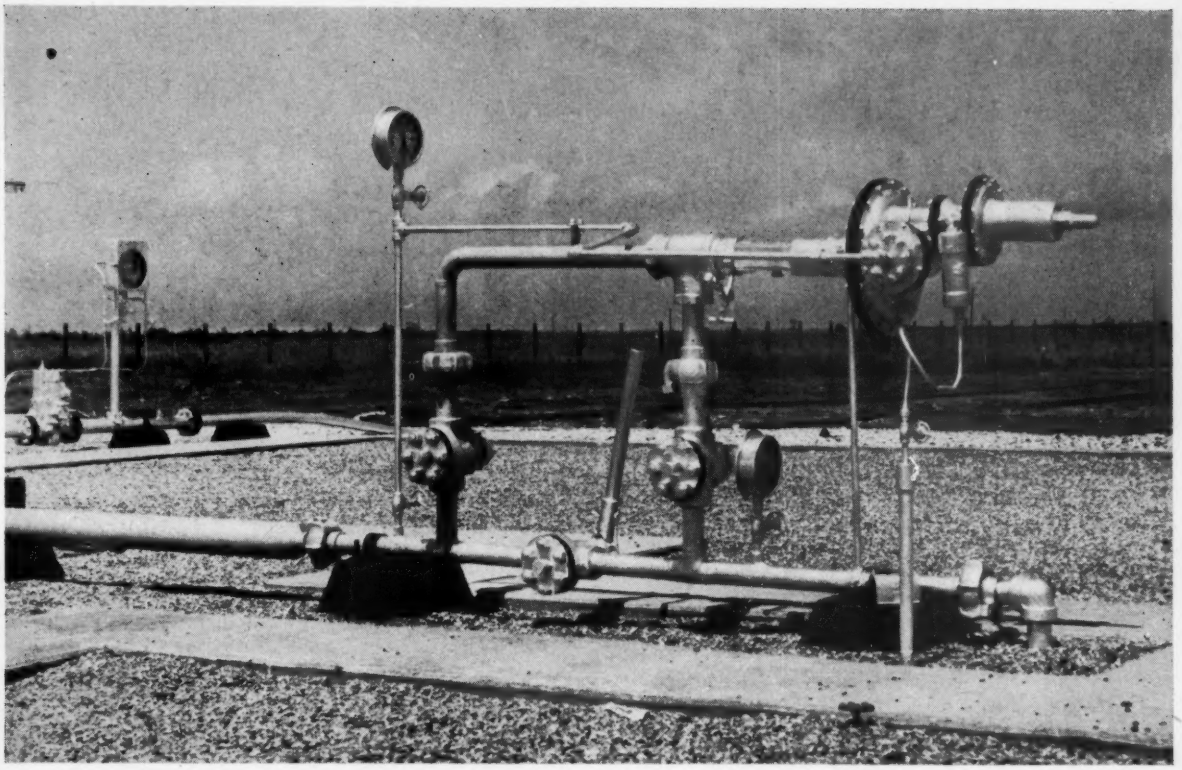
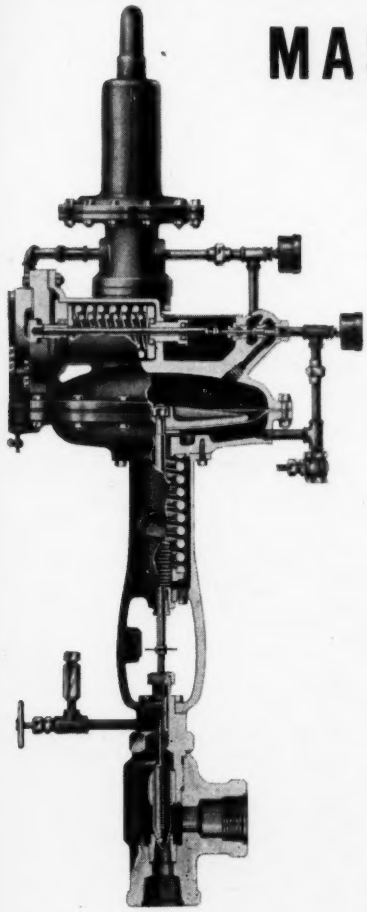




MASONEILAN REGULATORS

Reducing Natural Gas from 2000 lb. to 450 lb.

The above picture shows a typical Gulf Coast gas well installation for reduction of high pressure natural gas. This system utilizes the MASON-NEILAN Type 27-718 Pilot-Operated Pressure Reducing Regulator, normally closed, for reducing high pressures to reduced pressures suitable for field operations. This particular installation is serving as pressure make-up to compressors for natural gas injection, and is handling pressures from 2000# inlet to 450# reduced pressure. It is furnished complete with a 2" "MECO" prefabricated manifold, shop-tested and assembled, making it suitable for connection to new or existing field systems.

Your inquiry is invited

MAINTENANCE ENGINEERING CORPORATION

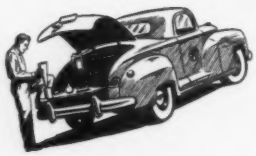
3611 CLINTON DRIVE
P. O. BOX 2637,
HOUSTON 1, TEXAS

EQUIPMENT WITH ENGINEERING SERVICE

MECO

Baroid

Coördinated Services Mean The Best Services



Baroid has tried conscientiously to make each element of its service the best obtainable. We believe we have succeeded. But, in addition, we have carefully coördinated each unit so that now, more than ever, operators everywhere can accept the fact that Baroid alone provides "a complete drilling mud service."

Here are some of the reasons why, as in the past twenty years, Baroid will produce the best in mud control.

FIELD ENGINEERS. More than 100 carefully trained field engineers are available to American operators to recommend procedure, maintain mud programs, and aid in solving drilling problems. Each has a modern laboratory-equipped car to aid him and the operator.

DRILLING MUD LABORATORIES. Laboratories in Los Angeles, Tulsa, and Houston, the finest exclusively devoted to drilling mud, constantly check products and methods. Many major improvements in mud technology have been produced in them. Many operators send their engineers through a course of mud training in these laboratories.

FIELD LABORATORIES. Three mobile field laboratories extend Baroid research right to the well. These well-equipped trucks enable Baroid engineers to conduct research under real field conditions.

FLYING FIELD SERVICE. Three airplanes, including a float plane and an amphibian, bring Baroid engineers to water jobs and other hard-to-get-at locations.

DISTRIBUTORS. More than 500 distribution points now provide Baroid products when and wherever needed. Still others will be appointed to meet demands.

BAROID SALES DIVISION
NATIONAL LEAD COMPANY
LOS ANGELES 12 • TULSA 3 • HOUSTON 2

PATENT LICENSES, unrestricted as to sources of supply of materials, but on royalty bases, will be granted to responsible oil companies and others desiring to practice the subject matter of any and/or all of United States Patents Nos. 2,041,086; 2,044,758; 2,064,316; 2,119,829; 2,294,877; 2,387,694; 2,393,165; 2,393,173; 2,417,307; and further improvements thereof. Applications for licenses should be made to Los Angeles office.

'S SIMPLE to SAMPLE OIL WELL PRODUCTION

with

PITTSBURGH METER and SAMPLER

ONLY 3 STEPS

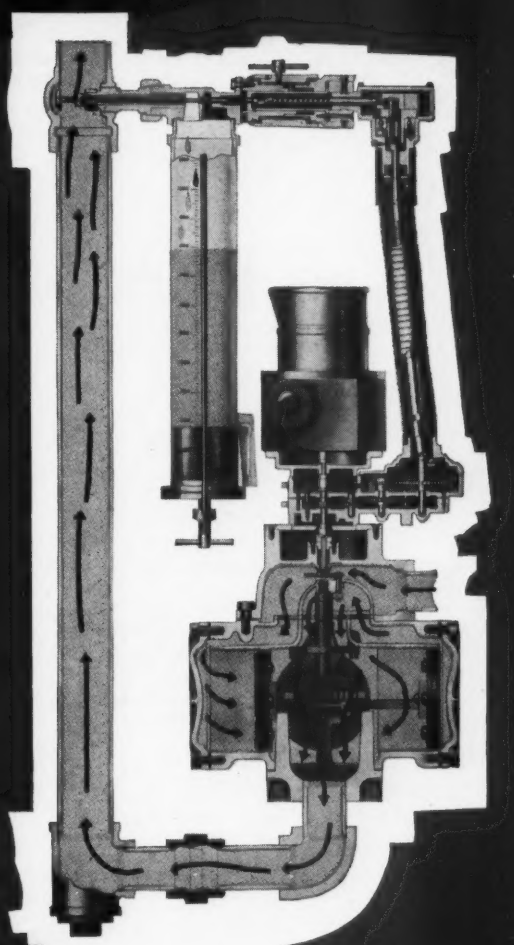
READ THE QUANTITY

A straight reading register on the accurate Pittsburgh positive displacement piston meter records the total production of the well in barrels.

SEE THE QUALITY

The percentage of oil against water content is determined at a glance by reading the graduated transparent sampler jar.

KNOW *TRUE* WELL PRODUCTION



HOW IT WORKS

Representative samples are taken from a rising stream, the only point where oil and water will mix in the same proportions as at the well head. The Pittsburgh Piston meter times the intervals when the sampler valve "grabs" a small sample of liquid. The amount of each "grab" and the frequency can be field adjusted to suit conditions.

Simply the oil percentage figure ... tool meter reading and you ... instantly the exact quantity ... produced over any period

BULLETIN OG-350

PITTSBURGH ... METER DIVISION

Pittsburgh 8, Pa.

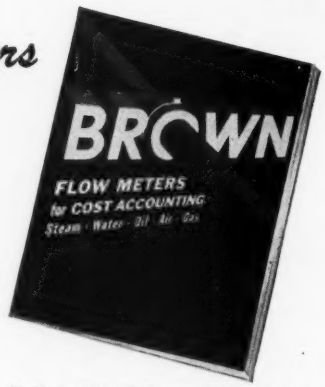
ROCKWELL

KNOCK-OUT STEAM WASTE

with Brown Flow Accounting Meters

Your costs for distribution and utilization of steam (or other fluid) will be known facts with the installation of Brown Flow Accounting Meters. Hourly and daily records from your Brown Flow Meters will enable you to know, not approximate, what is happening . . . where it is happening . . . when it is happening. You can deal a knock-out blow to waste and properly pro-rate expenses for each operation and each department. The Brown Flow Accounting System is producing sensational economies in many plants, repaying the original investment in a very short time.

Check, today, on the application of Brown Flow Accounting Meters to your processes! You can get detailed information in Bulletin 2022 . . . send for your copy!



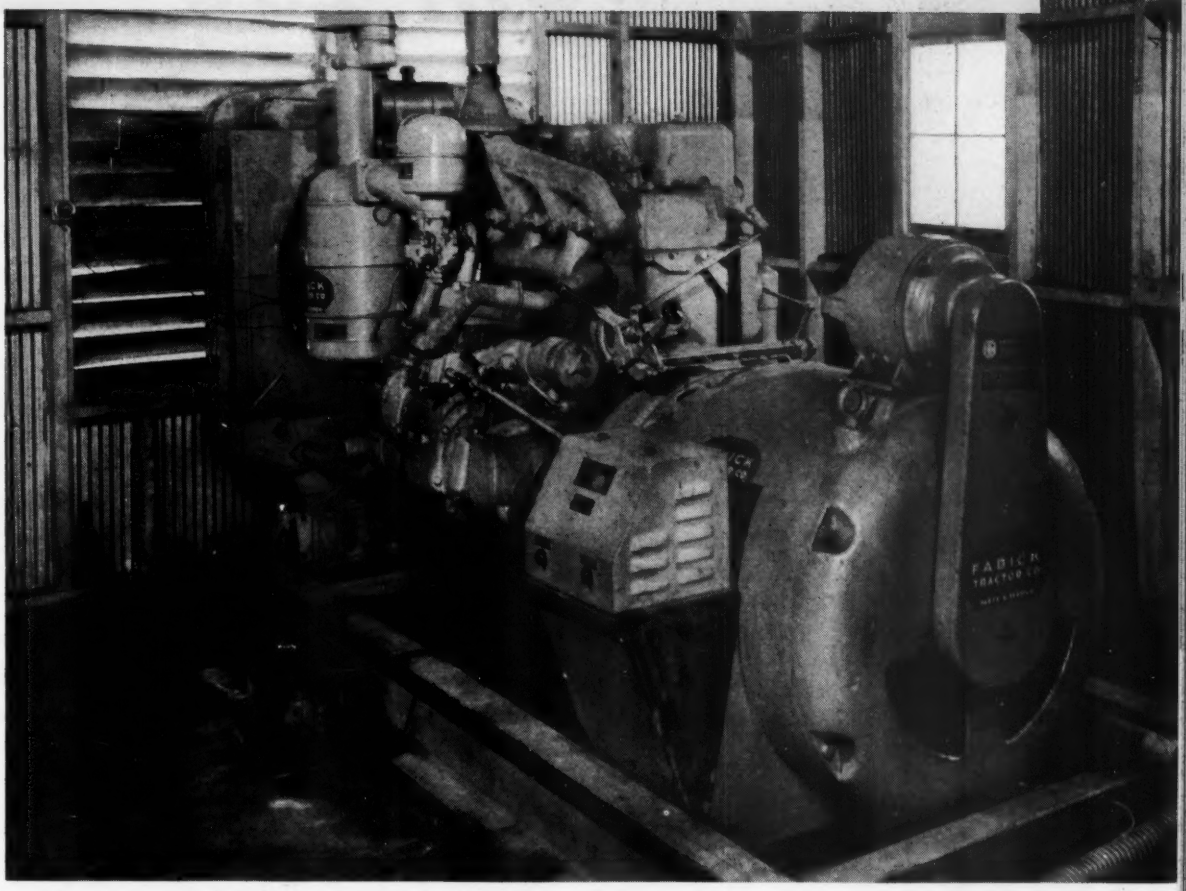
Bulletin 2022, "Brown Flow Meters for Cost Accounting," is complete and informative. A copy will be sent to you upon request. Write today!

Brown Recording Integrating Flow Meters are not expensive! For example, a complete unit for a six inch steam line costs less than $500.00!

MINNEAPOLIS-HONEYWELL REGULATOR CO.
BROWN INSTRUMENTS DIVISION
4488 Wayne Ave., Philadelphia 44, Pa.
Offices in principal cities of the United States, Canada and throughout the world

BROWN *Advanced Instrumentation* FOR THE PETROLEUM INDUSTRY
Product of MINNEAPOLIS Honeywell

Easy runs 'em!



YOU'RE looking at reliable, simple, trouble-free electric power for well pumping in the oil fields—one of many jobs "Caterpillar" Diesel Electric Sets are designed to do. This is one of two D13000 Diesel Electric Sets that are doing it for Walter Duncan in the Southern Illinois Field near Bible Grove.

Where are the control panels or voltage regulators? They aren't required with these self-contained, self-regulating D13000s. Neither are expert operators nor constant attendance. Simply crank them up and they provide dependable, uniform, low-cost power without pestering you for attention.

Walter Duncan operates his two D13000s alternately. They pump 400 barrels per day from six scattered wells. At the time this picture was taken, one electric set had 8662 hours on its hour meter—the other, 3672 hours. And they have thousands more hours of useful life ahead of them.

CATERPILLAR TRACTOR CO., PEORIA, ILLINOIS

CATERPILLAR DIESEL

REG. U. S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

XUM

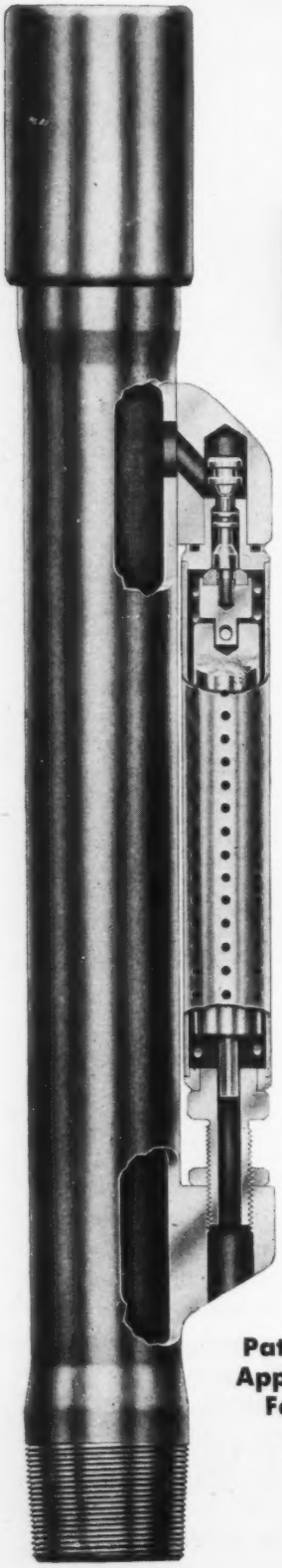
NOW

The NIXON Line of Gas Lift

NIXON

"Weight-Loaded"

...for TUBING FLOW



Patent Applied For

For many years the Nixon "Wire Line" Surface Control Gas Lift System has been recognized by the Industry as the outstanding method of producing low fluid level wells.

Now—after a long period of development and field trials, Nixon "Weight Loaded" Gas Lift Flow Valves have been perfected to successfully handle medium and high fluid level producing wells.

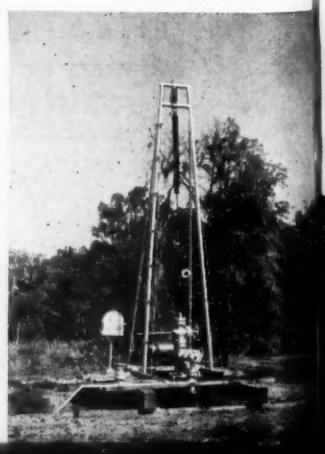
These new Nixon Valves are controlled by fluid and input gas pressure. They are furnished in two types: for producing thru the tubing; and for producing thru the annular space between the tubing and the casing.

Total volume of fluid to be produced determines the type Nixon Gas Lift Flow Valves to use; Wire Line-Intermittent Flow Valves; "Weight Loaded" Tubing Flow Valves or "Weight Loaded" Casing Flow Valves.

CAN BE USED WITH THE NIXON "WIRE LINE" GAS LIFT SYSTEM

The Nixon Type-N-121 "Weight Loaded" Tubing Flow Gas Lift Valve can be advantageously used in conjunction with the Nixon "Surface Control" Wire Line Gas Lift System—for automatically unloading fluid from wells. They can be used with new or any existing Nixon installations now in operation as an unloading Valve.

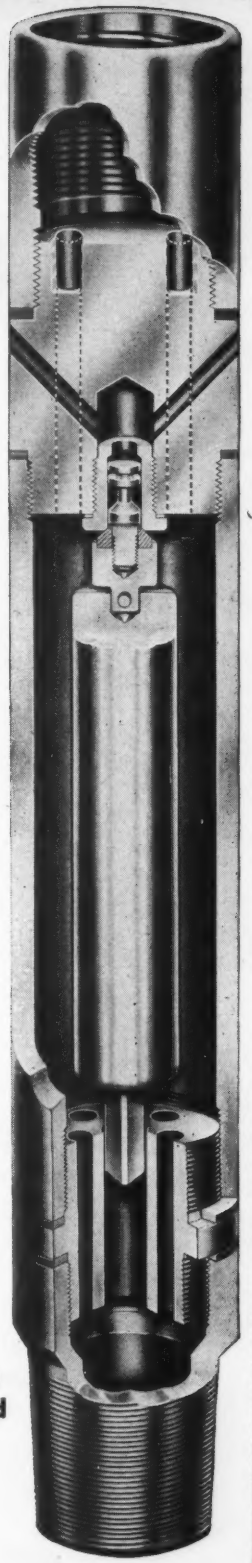
This "COMBINATION" of Automatic Unloading Valves, and Wire Line Operated Valves is completely covered by patents Nos. 2,132,081 and Re. 21,199.



XUM

Lift Equipment Complete with GAS LIFT FLOW VALVES

...for CASING FLOW



The outstanding features of these new Nixon "Weight Loaded" Gas Lift Flow Valves are: Simplicity of Design and absence of parts which fail thru fatigue.

Opening and closing action of the valves are controlled entirely by a solid steel weight and small, loose fitting piston. The operation of these parts is not affected by either temperature or pressure changes.

Once assembled, Nixon "Weight Loaded" Gas Lift Flow Valves remain in calibration throughout their long life.

It is never necessary to return these new Nixon Valves to the manufacturer for servicing as they can be completely serviced in the field by replacing three inexpensive small parts. They can then be re-run without testing in a pressure chamber.

If you are interested in these NEW "Weight Loaded" Differential Gas Lift Flow Valves—write for complete information contained in a 24-page illustrated booklet giving installation and operating data. Address:

Wilson Supply Company, Gas Lift Department, P. O. Drawer 19, Houston, Texas, or contact your nearest Wilson Supply Store.

Patent Applied For

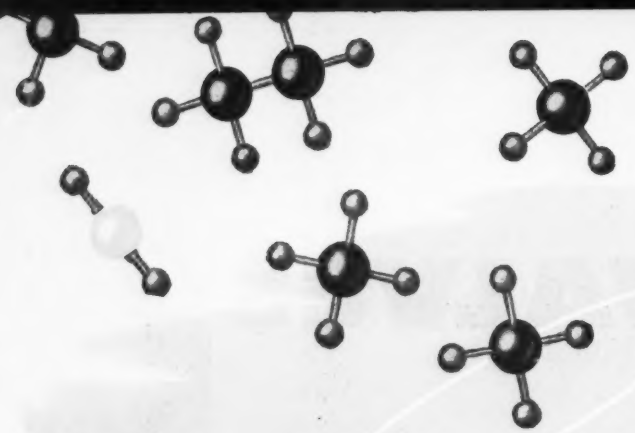
WILSON SUPPLY COMPANY

1412 MAURY ST., HOUSTON, TEXAS

SALES OFFICES: Tulsa, Oklahoma; Dallas, Texas.
SANTA FE SPRINGS, CALIF.: Atlas Production, Inc.
1126 Lakeland Road

BRANCH STORES: TEXAS—Kilgore, Beaumont, Barbers Hill, Bay City, Manahans, Alice, Victoria, Corpus Christi, Columbus. LOUISIANA—Lake Charles, New Iberia, Harvey, Shreveport, Houma. ARKANSAS—Magnolia.

XUM



SULPHUR

FROM SOUR NATURAL GAS

THE McKee organization has undertaken design engineering and construction of a plant for the manufacture of 150 tons per day of sulphur from sour natural gas.

This plant, when completed, will serve the dual purpose of conserving waste material and eliminating air pollution.

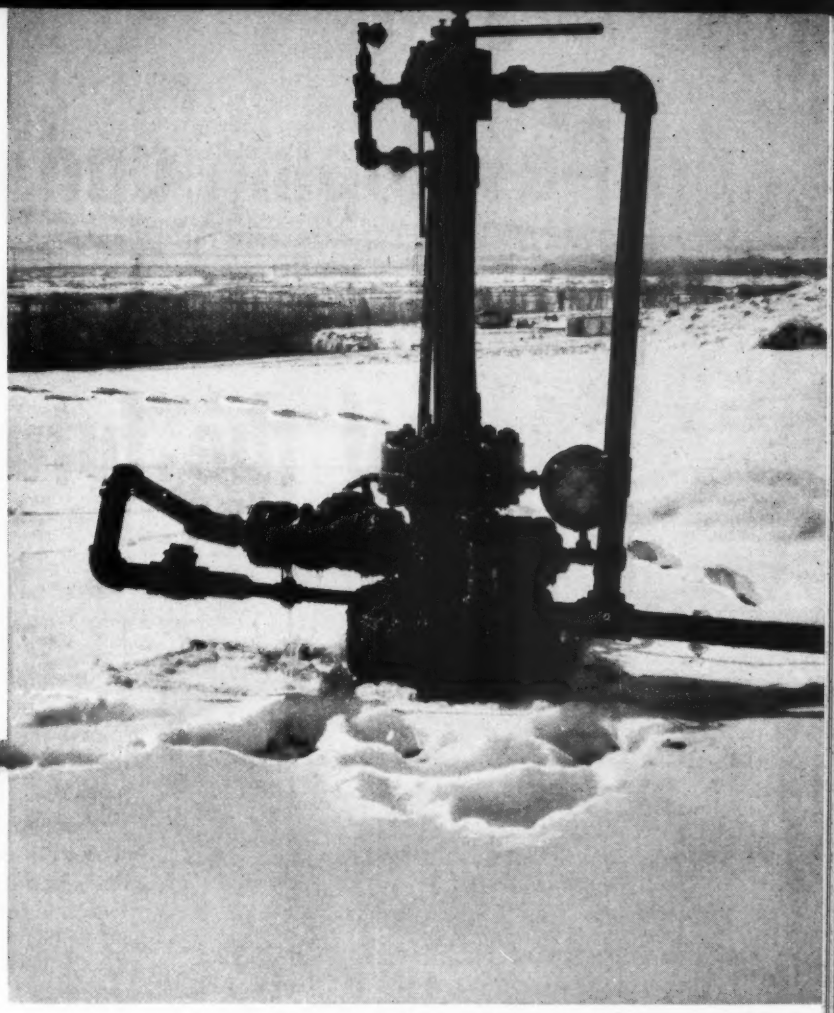
ARTHUR G. McKEE & COMPANY

DESIGN, ENGINEERING AND CONSTRUCTION FOR THE PETROLEUM REFINING AND IRON AND STEEL INDUSTRIES

ENGINEERS AND CONTRACTORS • ESTABLISHED 1905
2300 CHESTER AVENUE, CLEVELAND
30 Rockefeller Plaza, New York, N. Y.

XUM

Can you be *sure* this winter?



● Can you be sure of keeping up production, if snow or impassable roads isolate your lease? Your answer will be "yes," if you are a *Free Pump* operator.

A footpath to the wellhead is the only passage needed to completely service a Kobe Free Pump well anytime . . . rain, shine or snow. One man alone can quickly change the bottom hole pump and thus assure continuous production.

There's no waiting for equipment. No pulling expense to be added to your cost of lifting oil. No rigging up or tearing down time. Your well, regardless of the weather, is off production only the short time it takes to circulate the Free Pump in and out of the well.

Winter-time paraffin control, too, is solved by the hydraulic power that runs your Free Pump. If you want to be sure this winter . . . and if you want to eliminate many of your cold-weather pumping problems, change to Free Pumping. Your local Kobe representative has facts on installation costs that will interest you.

Free Pump

KOBE

ONE OF THE DRESSER INDUSTRIES

KOBE, INC. *General Offices:* Huntington Park, Calif. *Division and District Offices:* Avenal, Bakersfield and Huntington Park, Calif.; Rangely, Colo.; Ardmore, Oklahoma City and Tulsa, Okla.; Brownfield, Corpus Christi, Fort Worth, Houston, Longview, Odessa and Wichita Falls, Texas; Brookhaven, Miss.; Hobbs, New Mexico; and New York City.

THESE ARE THE DAYS OF FREE PUMPING

Developing and proving "Ethyl" antiknock compounds of the future

FIVE MAJOR IMPROVEMENTS IN "ETHYL" ANTIKNOCK COMPOUND HAVE RESULTED FROM AN INTENSIVE AND EXPANDING RESEARCH PROGRAM

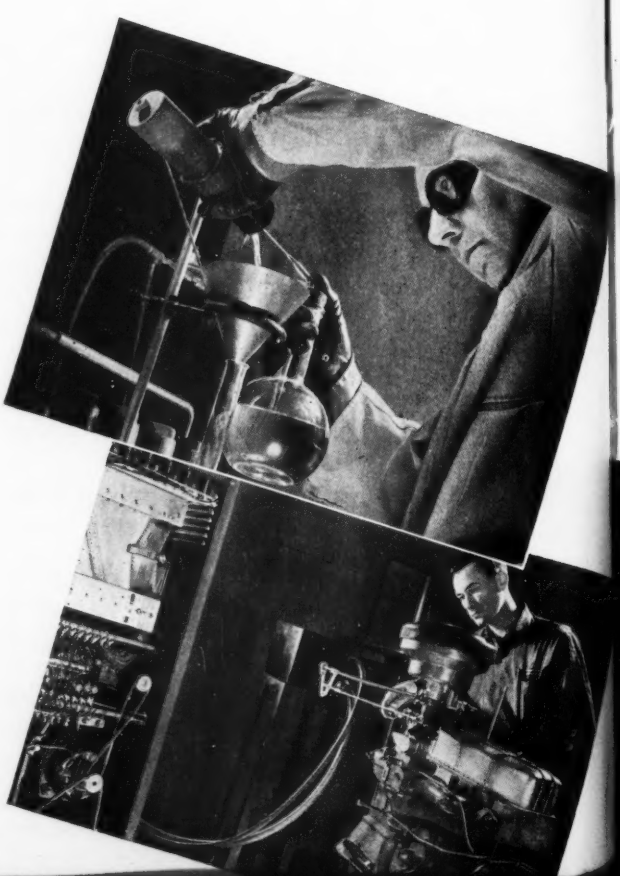
THE MANUFACTURER of antiknock fluid has an obligation to refiners to do far more than manufacture a compound. He must constantly improve his product and keep it up-to-date—in terms of the gasoline with which it will be blended—to insure maximum quality when added to the gasolines produced by the petroleum industry and used in the engines produced by the automotive industry. Thus technical advances in these two industries must be matched by equivalent advances in the formulation of "Ethyl" antiknock compound.

How well the Ethyl Research Laboratories have lived up to this obligation is indicated by the numerous changes—five of them major improvements—which have been made in "Ethyl" antiknock compound during the twenty-six years it has been marketed. Research aimed to make antiknock fluids of greater value to both refiner and ultimate consumer has been continuous and extensive.

There can be no stopping point in this research. As long as improvements continue to be made in fuels, lubricants and engines, the composition of antiknock compounds cannot remain static.

It is far from a simple project however, to keep pace with progress in the automotive and petroleum industries. When an antiknock compound is burned in an engine, much more is involved than the combustion of hydrocarbons and the suppression of knock. Each component of the antiknock compound may react with hundreds of components of the fuel and lubricating oil.

Further complicating the problem is the wide variety of engine conditions under which the gasoline containing the antiknock compound is used. Gasoline must work equally well in the family car,



CHEMICAL RESEARCH on antiknock compounds has been a continuous program at the Ethyl Laboratories for over twenty-five years.

GASOLINES CONTAINING new antiknock compounds are tested in laboratory engines under varying conditions of speed and load.

XUM

ENGINE PARTS are inspected before and after long tests involving changes in antiknock formulations.

the delivery truck, the high-speed bus and the farm tractor. Even after a superior "Ethyl" antiknock compound has been developed in the laboratory, a further long program is required to prove it satisfactory for all types of automotive service.

More than tetraethyllead

While tetraethyllead is the principal ingredient of "Ethyl" antiknock fluid, it is only one of a number of ingredients. Determining the most suitable other ingredients and their most effective proportions has always been a major part of the research program of the Ethyl Laboratories.

To this research Ethyl has devoted thousands of hours of engine studies in the laboratory, over ten million miles of test vehicle operation at the Detroit and San Bernardino Laboratories, and over four million miles of commercial vehicle operation in large truck and bus fleets operating under a wide range of conditions in different parts of the country and under the close supervision of Ethyl engineers. The last major change in "Ethyl" antiknock compound was made only after more than 17,000 hours of laboratory engine tests and over nine million miles of road tests had confirmed the desirability of the change.

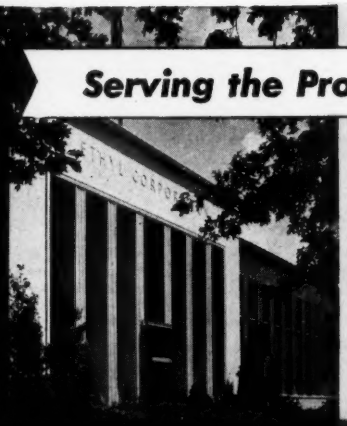
Many research projects on experimental fluids are now in progress in the Ethyl laboratories. The aim of all this research is to provide for refiners antiknock fluids which give the most satisfactory engine operation and which give the greatest economy in the production of gasoline.

This message is the eleventh in a series dealing with problems faced by refiners in producing gasoline for today's and tomorrow's engines, and the contribution of the Ethyl Corporation to their solution. Future messages will discuss other phases of this complex problem.

ROAD TESTS are made at Ethyl's San Bernardino laboratory to provide data on the road performance of experimental "Ethyl" fluids.

WHEN FAVORABLE RESULTS are indicated by dynamometer and vehicular research at the laboratory, new "Ethyl" fluid formulas are given final proof test in large commercial fleets.

Serving the Progressive Petroleum Industry Through Research



ETHYL CORPORATION

RESEARCH LABORATORIES

DETROIT, MICHIGAN . . . 1600 WEST EIGHT MILE ROAD

SAN BERNARDINO, CALIFORNIA . . . 2600 CAJON ROAD

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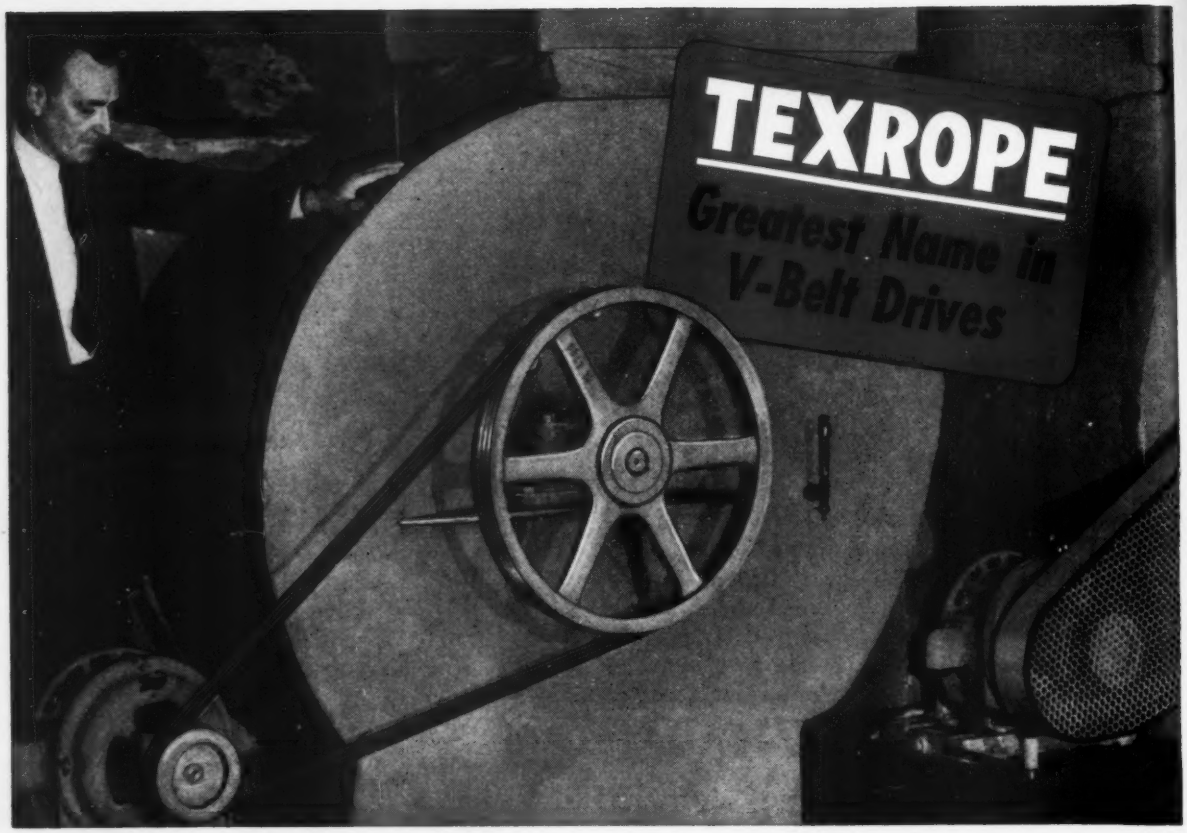


100,000 Hours

FROM ONE SET OF "SUPER-7" V-BELTS!

OVER 14 YEARS AGO, 66 complete *Texrope* drives were installed in New York's famous RCA building . . . on air-conditioning equipment for the NBC radio studios. Today, some of these *original* V-belts are still running, 20 hours a day, week in, week out!

Texrope drives were selected for two major reasons: First, they are completely noiseless and tend to dampen vibration of other parts. Second, multiple belts offer a greater safety factor, assuring service continuity. Now, after 14 years, a "bonus" of exceptionally long life has been added.

Records like this are one reason why more *Texrope* industrial V-belt drives have been installed since 1925 — when Allis-Chalmers originated the multiple V-belt drive — than any other kind.

Texrope drives offer you the widest selection of V-belt products in industry . . . V-belts, standard, adjustable and variable-speed sheaves, and speed changers.

Send for Pre-engineered Drive Manual — Lists stock components to cover 90% of V-belt drives. See your A-C dealer or District Office, or write direct for bulletin 20B6956. Also in Sweet's.

Texrope Super-7 V-belts result from the cooperative research of Allis-Chalmers and B. F. Goodrich; and are sold only by A-C dealers and offices. *Texrope* and *Vari-Pitch* are Allis-Chalmers trademarks. A 2614

ALLIS-CHALMERS, 1059A SO. 70 ST.
MILWAUKEE, WIS.

ALLIS-CHALMERS

Sold . . .
Applied . . .
Serviced . . .

by Allis-Chalmers Authorized Dealers, Certified Service Shops and District Offices throughout the country.

MOTORS — ½ to 25,000 HP and up. Matching Allis-Chalmers Control.

TEXROPE — Belts in all sizes and sections, standard and Vari-Pitch sheaves, speed changers.

PUMPS — Integral motor and coupled types. Sizes and ratings to 2500 GPM.

-160°F or +1000°F

...There's a

CHAPMAN

STEEL VALVE

for every operating need

Whatever the temperature of fluids or gases, from —160° F. to more than 1000° F., Chapman has a steel valve that has been specifically designed to give trouble-free service.

Every valve in this extensive line is quality-controlled during every step in manufacture from the metals developed and produced in Chapman's own foundries to final shipment to you. And, though manufactured with production line speed and economy, each has the precision rating of custom-made valves—equalling or exceeding standard specifications.

It will pay you to check the Chapman line first before you order. For additional information on Chapman's unusually wide range of sizes and types, write today to:

The Chapman Valve Manufacturing Co.

INDIAN ORCHARD, MASS.

Announcing

20 watts!

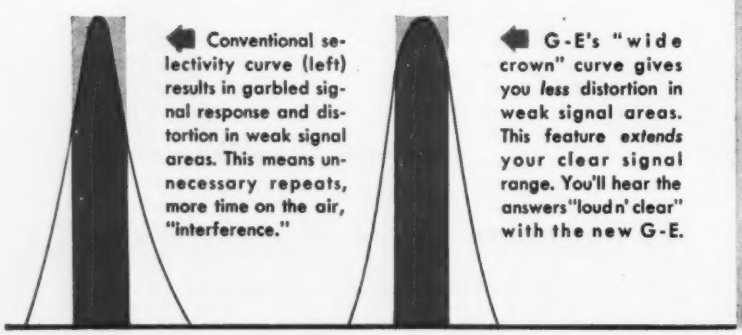
Service-tested!

Performance-engineered!

Packed with power!

152-162 MC

THERE'S A *BIG* DIFFERENCE! *HERE'S WHY—*



◀ Conventional selectivity curve (left) results in garbled signal response and distortion in weak signal areas. This means unnecessary repeats, more time on the air, "interference."

◀ G-E's "wide crown" curve gives you *less* distortion in weak signal areas. This feature *extends* your clear signal range. You'll hear the answers "loud n' clear" with the new G-E.

Performance-Engineered at Electronics Park!

- **More power at lower cost!**
- **Rock-steady circuits—minimum drift!**
- **Operates for long periods without attention! Quick-shift plug-in design reduces out-of-service time.**
- **Basic Mobile and Station units interchangeable!**

XUM

a NEW 2-way-radio by GENERAL ELECTRIC

● 20 GROUND-GAINING WATTS IN A SINGLE PACKAGE! ● GIVES YOU *FULL* USE OF YOUR CHANNEL—WITHOUT WEAK SIGNAL DISTORTION! ● IMMEDIATE DELIVERY FROM STOCK!

Now in full production at Electronics Park—General Electric's new MC-201 mobile units combine all the important improvements you've been waiting for!

Subjected to grueling field tests before a single one was manufactured for sale, the new G-E is a tough, powerful piece of equipment built specifically for *your* radio communication needs. It delivers outstanding service at low cost.

Get the facts today! This new bulletin on the MC-201 is yours for the asking. (We will also send you, on request, complete information on G-E's full line of radio communication equipment: 25-50 MC and 920-960 MC). Call the G-E office nearest you or write: *General Electric Company, Box 1122, Electronics Park, Syracuse, New York.*

READ WHAT THEY SAY ABOUT THE PRE-PRODUCTION TESTS!

"We installed new MC-201 mobile units in our cars. We tested them rigorously for a year in every kind of weather and gave them more than normal abuse. The sets continue to give sharp, clear transmission and reception. We're ordering more of them from G.E."*

"We have installed the new G-E MC-201 units in our fleet and have operated with them for the past six months. Their performance has been excellent and maintenance costs exceptionally low. As a result, we plan to expand our system immediately with additional G-E units."*

*Names on request.

You can put your confidence in—

GENERAL ELECTRIC

THE YARDSTICKS OF OIL FIELD SERVICE

Research

Research is, in a sense, an extra return on your investment.

It directs part of the money you pay for services and products to the development of better services and products.

From its earliest days, Halliburton has considered research among its most important obligations and most valuable services. A small group of technicians using crude equipment has developed into one of the largest and most modern research departments of its kind. A modest schedule of activities has grown into one of the largest privately supported research programs in the field of oil production.

Howco research embraces chemistry and metallurgy, test and analysis, experiment and development. It includes studies of materials and processes under conditions which simulate those of a 20,000 ft. well.

Out of Howco research have come discoveries and developments of basic importance to present-day drilling. From it may be expected discoveries and developments that will assist in meeting tomorrow's problems and conditions.

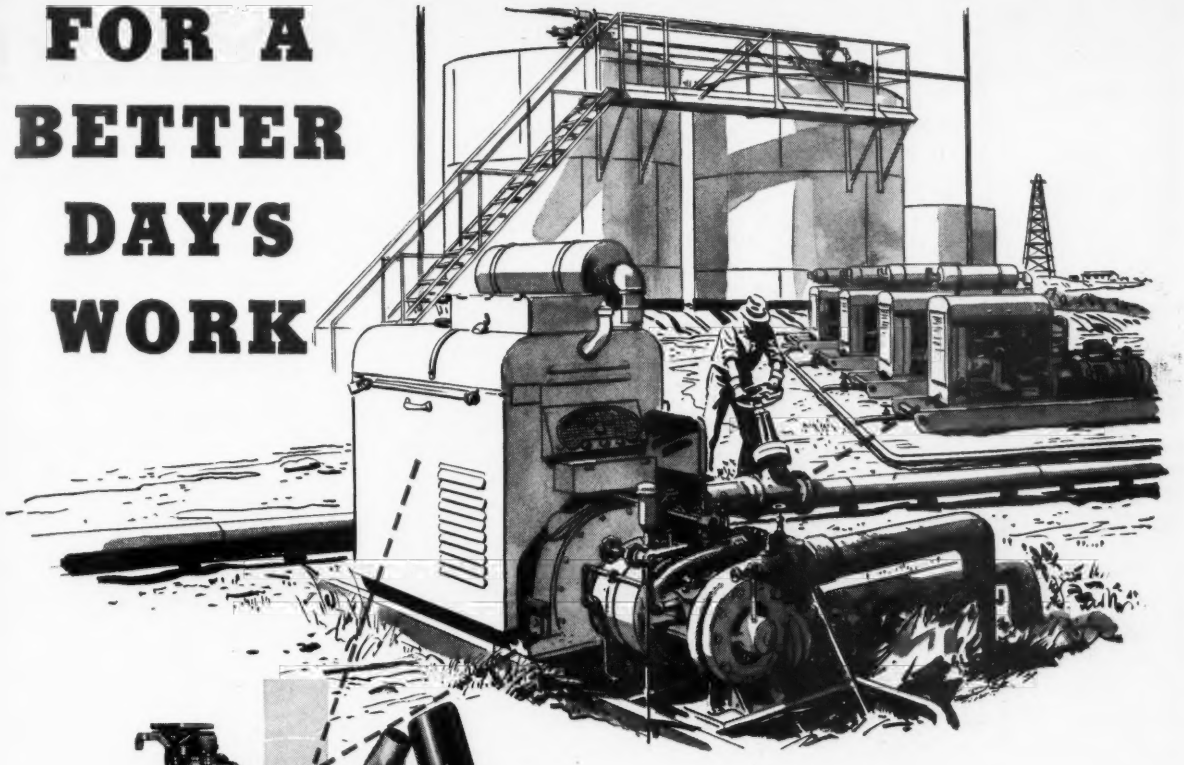
A good question to ask when evaluating a source of supply is this: How deep is its interest and how far-reaching its contributions to the industry it serves? Halliburton interest and Halliburton contributions to drilling progress are a matter of record.

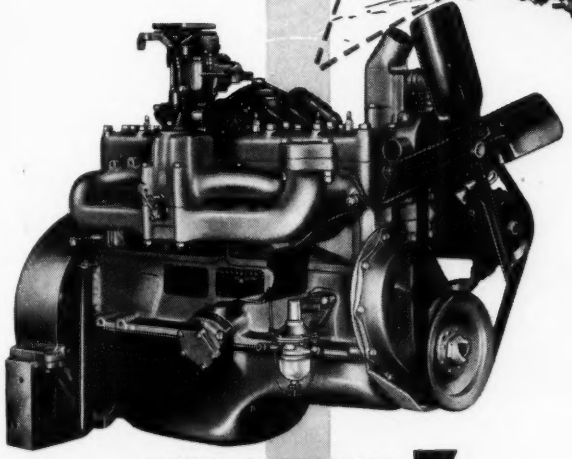
Halliburton

OIL WELL CEMENTING COMPANY

THERE IS NO SUBSTITUTE FOR EXPERIENCE IN OIL WELL CEMENTING

FOR A BETTER DAY'S WORK





in oil fields—

IN INDUSTRY—ON FARMS—IN FORESTS AND ON THE HIGHWAYS!

● Pumping "black gold" from the earth . . . rushing oil along vital pipe lines into storage tanks . . . or providing field power for a hundred other jobs—those are just a few of the many assignments given to Chrysler Industrial Engines or Power Units. For dependable, economical, Chrysler-built power in any industrial or agricultural application, see your Chrysler Industrial Engine dealer,—or write for information to . . .

INDUSTRIAL ENGINE DIVISION, CHRYSLER CORP.
12200 E. JEFFERSON, DETROIT 31, MICHIGAN

MODEL INDUSTRIAL 7
SIX CYLINDER

One of the seven basic Chrysler Industrial Engine models. Bore 3¾". Stroke 5". 331.4 cubic inches Displacement. Engine assembly equipped with truck type clutch housing, 20" suction type fan, hot type oil bath carburetor air cleaner, carburetor with built-in velocity type governor, oil filter with removable type cartridge, and 6-volt electrical equipment. Generally used in powering snow shovels, industrial mobile units, sawmills and air compressors.

NATION-WIDE SERVICE
FACTORY-ENGINEERED AND TESTED PARTS WITH EXPERT MAINTENANCE WHEREVER YOU ARE

CHRYSLER

INDUSTRIAL ENGINES AND POWER UNITS

HORSEPOWER WITH A PEDIGREE

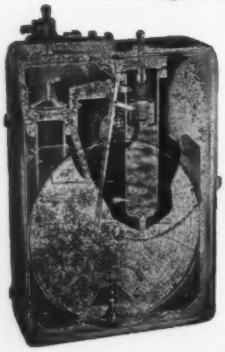
SIMPLIFIED DESIGN FOR ACCURATE LOW-COST OPERATION

As petroleum refining progressed from straight run processes through all the intricacies of modern refining methods METRIC American Orifice Meters have kept pace. They meet—and in many cases exceed—demands for accuracy and low-cost operation under tough conditions.

There are few moving parts, simply designed, interchangeable, easily replaced—only *one* between the surface of mercury and chart record.

Adjustment is easy—needing only screw driver, wrench and pliers. Every part is readily accessible. Cleaning does not interfere with operation.

The world over, experienced metric engineers acknowledge the ruggedness and dependability of METRIC American Meters.



Technical literature, on Indicating, Recording or Integrating Flowmeters, Pressure Regulators, Liquid Level and Flow Controllers will be mailed on request.

AMERICAN METER COMPANY

INCORPORATED (ESTABLISHED 1836)

Albany • Atlanta • Baltimore • Birmingham • Boston
Chicago • Dallas • Denver • Erie • Houston • Joliet
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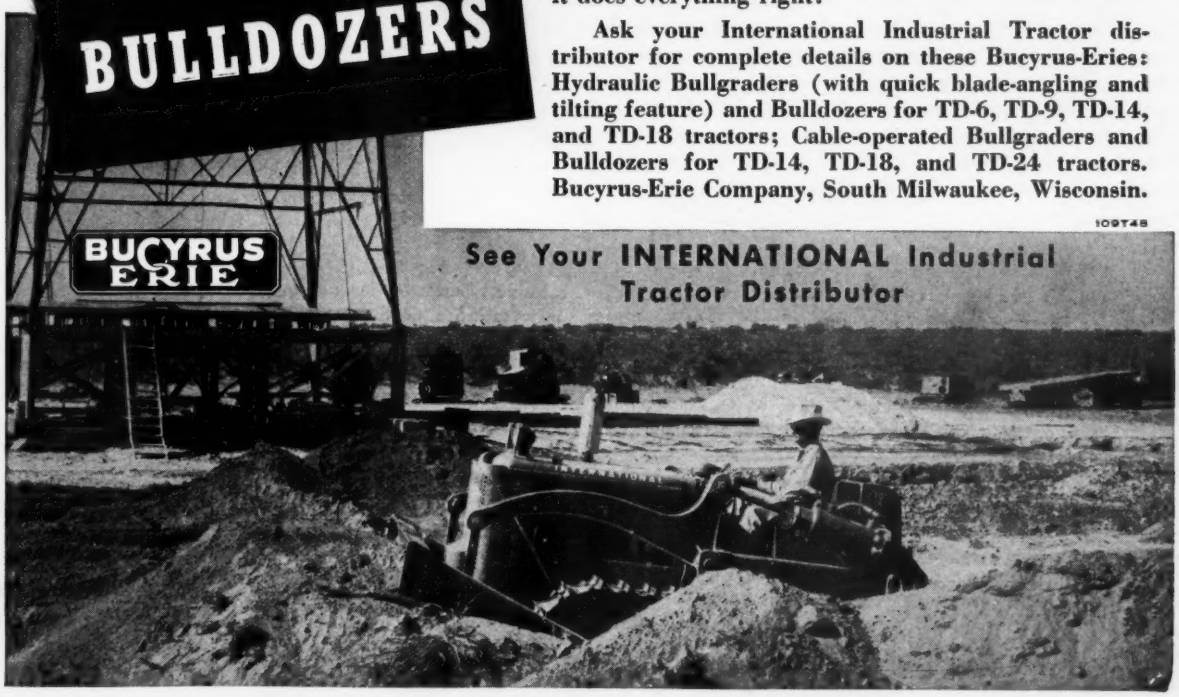
DON'T LET DIRT PUSH YOU AROUND

Use BUCYRUS-ERIE BULLGRADERS *and* BULLDOZERS

YOU'RE always a step ahead of dirt moving problems with Bucyrus-Eries — the important step that gets drilling and production off to a fast start. Bucyrus-Eries move dirt faster and stay on the job longer because, from the start, they're engineered for perfect teaming with International Crawler tractors. It's a combination that saves time and money because it does everything right!

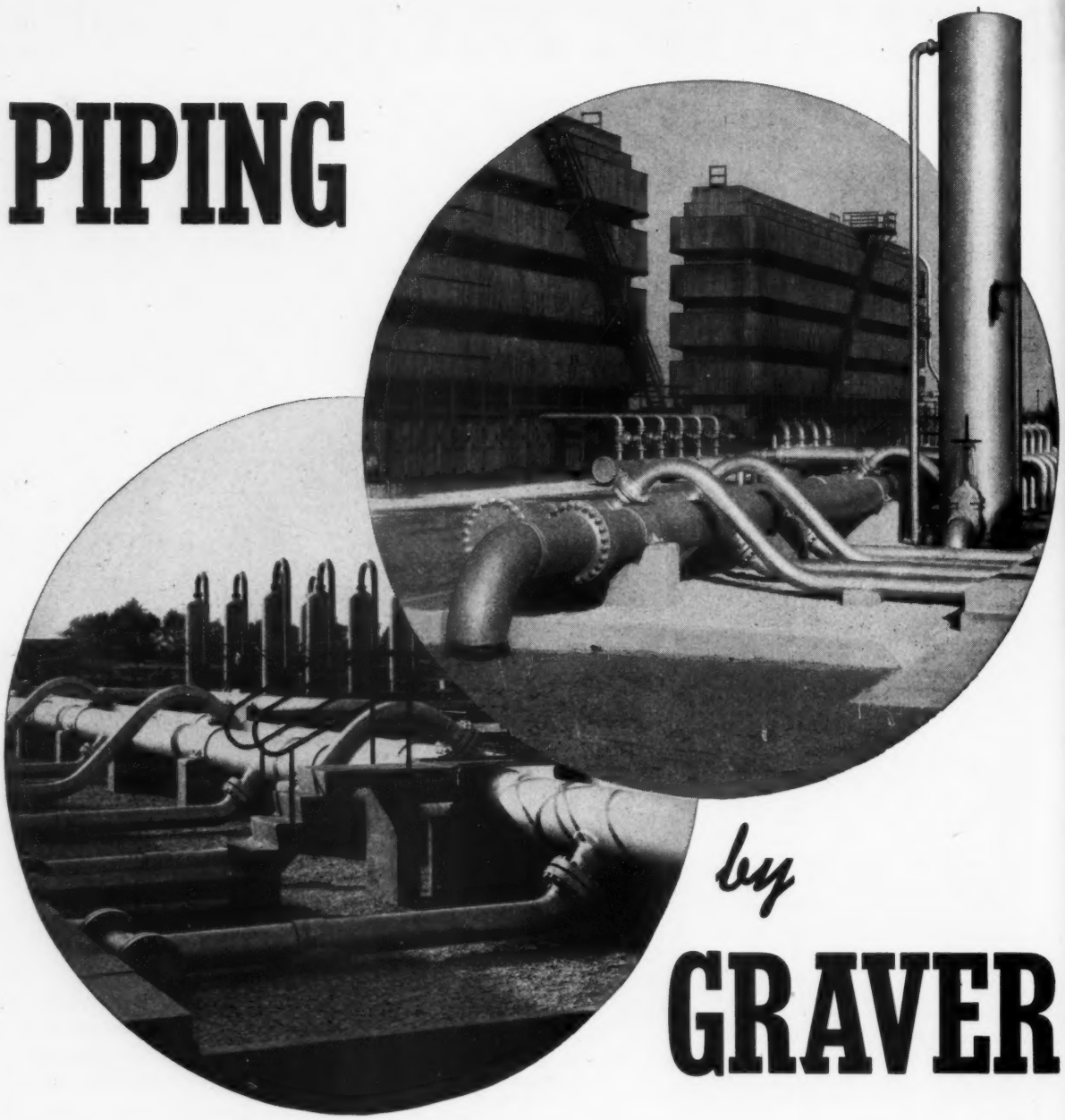
Ask your International Industrial Tractor distributor for complete details on these Bucyrus-Eries: Hydraulic Bullgraders (with quick blade-angling and tilting feature) and Bulldozers for TD-6, TD-9, TD-14, and TD-18 tractors; Cable-operated Bullgraders and Bulldozers for TD-14, TD-18, and TD-24 tractors. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

109T48



See Your INTERNATIONAL Industrial Tractor Distributor

PIPING



by

GRAVER

In this case it's piping. In another case it may be erection of heavy vessels, foundations, equipment setting, brick work, electrical installations. Or the entire job may be a Graver job . . . from initial engineering to completion of the field work. In any case the Graver Construction Co. offers a complete service to the petroleum and chemical industries for the engineering and building of new facilities or the expansion and modernization of existing facilities.

Graver's thoroughly seasoned personnel, plus strategically located equipment depots, will prove a valuable asset on your next job. Why not call Graver *today!*

GRAVER CONSTRUCTION CO.

A Division of

GRAVER TANK & MFG. CO., INC.

East Chicago, Indiana

NEW YORK **CHICAGO** **HOUSTON**

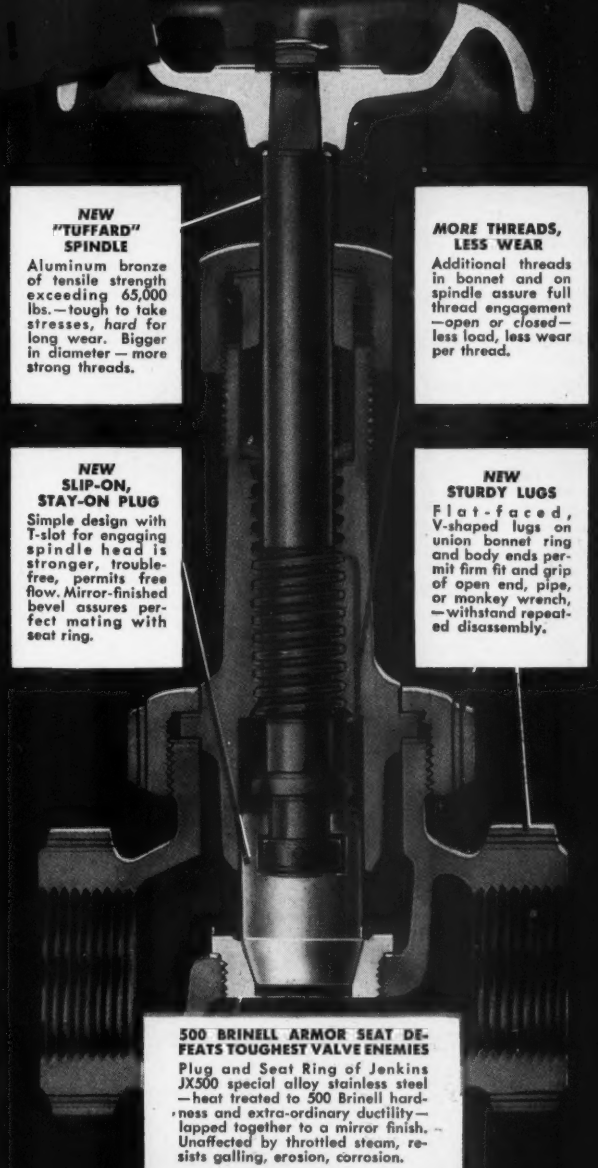
Engineering Dept. — 880 Bergen Ave., Jersey City, N. J.

JENKINS Fig. 976-A

PLUG TYPE

Armor Seat

BRONZE GLOBE VALVE



NEW "TUFFARD" SPINDLE

Aluminum bronze of tensile strength exceeding 65,000 lbs.—tough to take stresses, *hard* for long wear. Bigger in diameter—more strong threads.

***MORE* THREADS, LESS WEAR**

Additional threads in bonnet and on spindle assure full thread engagement—open or closed—less load, less wear per thread.

NEW SLIP-ON, STAY-ON PLUG

Simple design with T-slot for engaging spindle head is stronger, trouble-free, permits free flow. Mirror-finished bevel assures perfect mating with seat ring.

NEW STURDY LUGS

Flat-faced, V-shaped lugs on union bonnet ring and body ends permit firm fit and grip of open end, pipe, or monkey wrench,—withstand repeated disassembly.

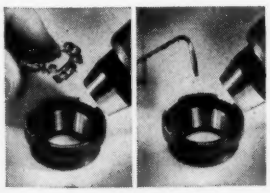
500 BRINELL ARMOR SEAT DEFEATS TOUGHEST VALVE ENEMIES

Plug and Seat Ring of Jenkins JX500 special alloy stainless steel—heat treated to 500 Brinell hardness and extra-ordinary ductility—lapped together to a mirror finish. Unaffected by throttled steam, resists galling, erosion, corrosion.

300 lbs. Steam 600 lbs. O.W.G.

BUILT TO BREAK RECORDS FOR LONG LIFE

Now, for the most severe services, you can choose the new Jenkins Fig. 976-A with complete confidence that it will set new economy records. Use it for pressure regulation, bleeds, drips, and drains, or any close regulation of steam that threatens wire drawing. It will lower maintenance, last longer, where entrapped pipe chips, scale, or rust tubercles are a problem.



SMASHED PIPE CHIPS, WIRE, LEAVE NO SCARS

Steel pipe chips and 1/16" wire rod, with Brinell hardness in excess of 300, were crushed between the new Jenkins JX500 Plug and Seat Ring without leaving a scratch or dent. That's proof of super hardness!

Compare Fig. 976-A, part for part, and see why it's as nearly wear-proof, trouble-proof, and maintenance-free as any stock valve can be. Only a few of the dozen ways it's better are shown here. Get the complete story in the new folder. See why it's unrivalled for endurance and economy,—why it's your best buy in plug-type valves! Use coupon.

Jenkins Bros., 80 White St., New York 13; Bridgeport, Conn.; Atlanta; Boston; Philadelphia; Chicago; San Francisco. Jenkins Bros., Ltd., Montreal.

TRADE JENKINS MARK

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JENKINS VALVES

Types, Sizes, Pressures, Metals for Every Need

GET COMPLETE DETAILS—IN THIS NEW FOLDER

Mail Coupon Today!

JENKINS BROS., 80 WHITE ST., NEW YORK 13

Please send Armor Seat Valve folder—Form 19

Name .....

Company .....

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.....

PARKERSBURG PUMPERS
Pay . . . and pay . . . and pay!

First cost is the last cost, and that's why Parkersburg Pumpers pay off in savings on maintenance costs, year after year. Quality-built throughout they have proved the industry's most dependable pumpers for trouble-free service.

Crank and beam balance permits accurate balance of load. Herringbone gears assure greatest power out-put with least amount of friction. Precision bearings throughout mean smoother operation. Floor clearing models minimize foundation costs. Your choice of any type engine or electric motor power unit . . . chain or gear drive.

Consult the Parkersburg Representative nearest you when you have a pumping problem to solve. There's a Parkersburg Pumper ready for your job.

4905

THE PARKERSBURG RIG & REEL CO.

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GENERAL OFFICES, PARKERSBURG, W. VA.
Plants at Parkersburg, W. Va., Coffeyville, Kan., Houston, Texas

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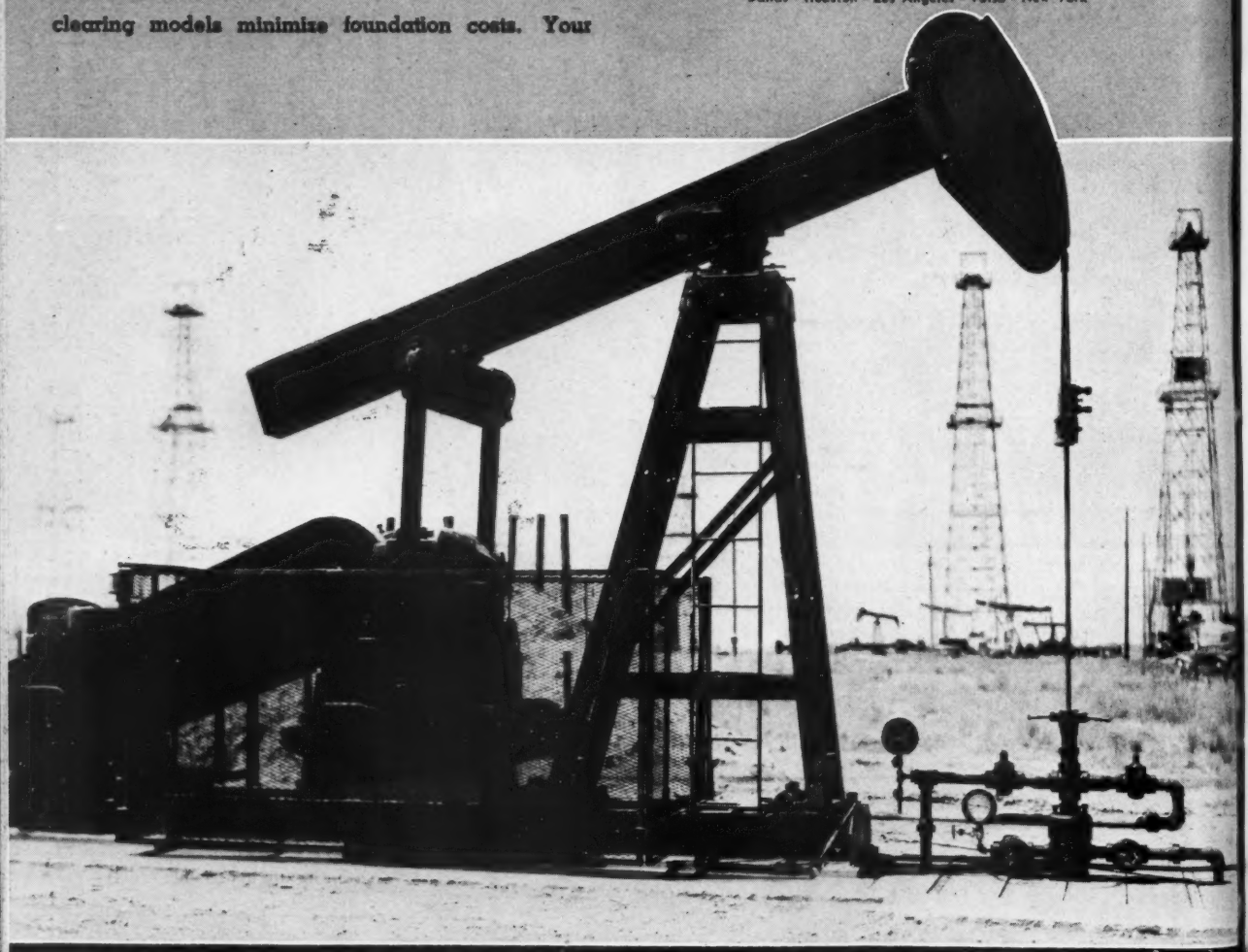

PARKERSBURG

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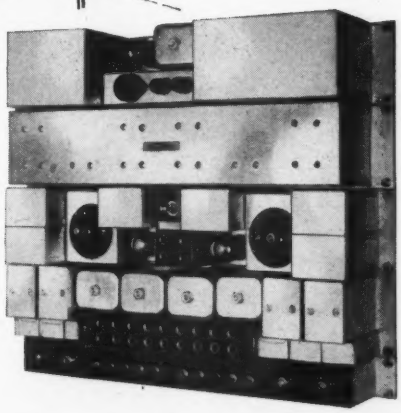
QUICK QUIZ

With a Helpful Answer

FOR COMMUNICATIONS MEN



Problem:

A company has a circuit between offices "A" and "B" consisting of 40 miles of No. 12 BB iron wire. Extending from "B" to "C" is another circuit made up of 25 miles of No. 12 BB iron. Changing traffic conditions call for a direct through circuit from "A" to "C". The use of the existing wire facilities does not provide acceptable transmission since the measured loss is 20 db and requirement is for a 5 db to 6 db circuit. How can this requirement be met?

Possible Solutions:

(a) One possibility would be the replacement of the iron wire with .104 copper wire. This would provide a calculated 4.5 db circuit but present day wire and construction costs would require an expenditure ranging from $12,000.00 to $18,000.00.

(b) Another solution would be the use of a voice frequency telephone repeater at location "B" capable of a minimum *usable gain* of from 14 db to 15 db under all ordinary weather conditions. If such a repeater could be found then this, obviously, would be the correct solution since the cost of a repeater is less than 5% of the cost of wire replacement.

The Logical Solution:

Yes—the logical solution is a voice frequency telephone repeater—*if* it's a Kellogg Repeater. Here's why—

One of the most important factors in obtaining maximum usable gain in a voice frequency repeater is the limitation of the band of frequencies to be amplified. In the Kellogg repeater this is accomplished in the No. 204 filter which has exceedingly sharp cutoff characteristics outside the voice band, i.e. below 300 cps and above 2700 cps.

Another very important consideration in establishing stable balance at the highest gain is the ability to obtain fine adjustments of resistance and capacity in the balancing net with the maximum of ease. This ideal condition is provided in the No. 1 balance network of the Kellogg repeater by the use of continuously variable potentiometers (two in each net) and a series of small capacity steps both readily adjustable by hand or screw driver. **Thus the time-consuming and comparatively inaccurate method of strapping to adjust for balance is completely eliminated.**

Gain adjustments (also screw driver adjusted from the front of the repeater) are accurately calibrated in 1 db steps so that the gain being obtained is always known without the necessity for measurement. Other refinements in Kellogg repeater design include (1) the use of push-pull amplification eliminating harmonic distortion and cross talk or other interference which may be introduced through the power source, (2) the operation of all components at conservative values of current and voltage well below the maximum ratings assuring long, trouble-free life, (3) unit type construction mounting on standard 19" equipment racks thus giving the flexibility necessary for adaption to various circuit requirements, (4) a wide variety of line units for different circuit or signalling functions and (5) provision of test and monitoring jacks for checking tubes and repeater operation.

Kellogg Repeaters are available for operation from either 24 volt or 48 volt battery or from a 105-125 volt 60 cycle AC power source.

SEND FOR OUR REPEATER BOOKLET NOW!

KELLOGG SWITCHBOARD AND SUPPLY COMPANY

REPEATER

6650 SOUTH CICERO AVENUE • CHICAGO

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6650 So. Cicero Avenue
Chicago 38, Illinois

Please send Repeater Booklet to:

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ADDRESS_____

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WHEN WATER IS
HOT...BAD...or EXPENSIVE

FLUOR FIN·FAN HEAT EXCHANGERS

COOL AT LOWEST COST

Hot! Bad! Expensive! When the temperature of the fluid to be cooled is much higher than ambient air temperature, when available water has bad scaling characteristics, or when make-up water is scarce and expensive, then you should definitely investigate the use of a Fluor Fin • Fan heat exchanger.

Guaranteed Performance

Whether used to cool process liquids, water, or gas, Fluor Fin • Fans always fulfill their performance guarantee. You can definitely count on the Fluor guarantee when calculating operating efficiencies.

Fin • Fan cooling units consist of finned tubes, across which air is circulated by variable-pitch fans. They are manufactured and sold by Fluor and the Griscom-Russell Co.

This Fluor Fin • Fan cools 8460 gpm of jacket water for a large pipe-line compressor station.

Guarantee: 162° to 150° cooling at 100° (dry bulb) air.

Performance: as guaranteed

photo by Elwood M. Payne

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BE SURE WITH FLUOR

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THE FLUOR CORPORATION, LTD.

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493

Aerator Towers

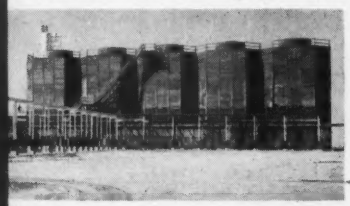
Counterflo Towers

Pulsation Dampeners

Gas Cleaners

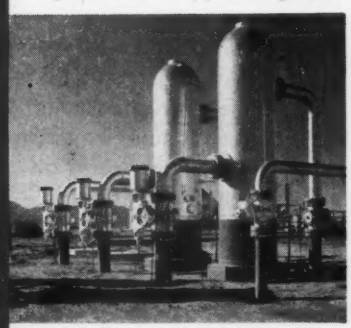
Mufflers

Fluor Aerator cooling towers have distinctive economy features and are most practical in certain cooling applications.

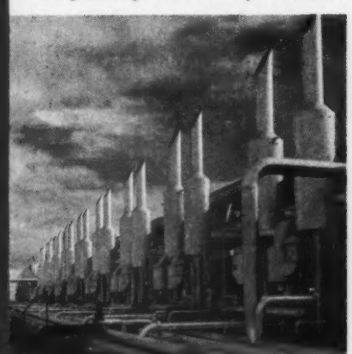


Fluor Counterflo induced-draft cooling towers are a standard of industry for most water-cooling applications. They deliver "colder water cheaper."

Fluor pulsation dampeners remove destructive vibrations and instrument irregularities caused by pulsative gas flow.



The Fluor gas cleaner, already well-known for efficient cleaning, has been redesigned to give still better performance.



Fluor mufflers, redesigned to incorporate pulsation-dampener principles, reduce exhaust-line noises to less than the mechanical noises of the compressor room.

COUNT THE MANY YEARS
OF *FINE CARE-FREE SERVICE*

MORE WATER
LOWER COST

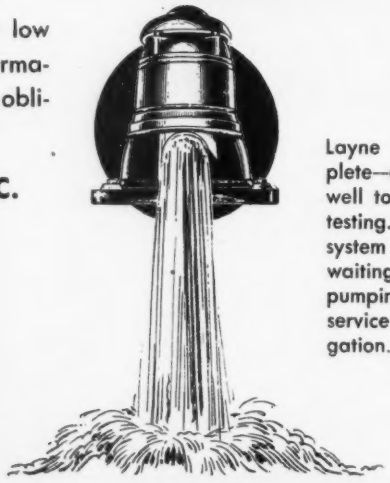
Water supply for the petroleum field is no longer a small item. Almost every new step in refining requires more and more. This means that water supply systems must be much higher in production capacity, more efficient in operation and more dependable for around the clock continuous pumping.

On all of those essential points, Layne Well Water Systems have outstanding features. They are designed and built for extra heavy industrial use. They are equipped with the world famous high efficiency Layne Vertical Turbine Pumps—long recognized as the finest made.

Installed with Layne Gravel Walls and Layne Shutter Screens, these water systems have tremendous production capacities. They are rugged enough in construction to stand up to their tasks for years and years with little or no upkeep expense.

If you need more water—at very low cost, call or write for complete information, catalogs, bulletins, etc. No obligation. Address

LAYNE & BOWLER, INC.
General Offices
MEMPHIS 8, TENN.



BUILT COMPLETE BY LAYNE

Layne will build your water system complete—everything from the drilling of the well to the installation of pumps and final testing. No divided responsibility. Your water system contract is fulfilled by Layne men. No waiting for another crew. No delay on pumping equipment. Complete facts on this service will be provided on request. No obligation.

LAYNE
WELL WATER SYSTEMS

AFFILIATED COMPANIES — Layne-Arkansas Co., Stuttgart, Ark. ★ Layne-Atlantic Co., Norfolk, Va. ★ Layne-Central Co., Memphis, Tenn. ★ Layne-Northern Co., Mishawaka, Ind. ★ Layne-Louisiana Co., Lake Charles, La. ★ Louisiana Well Co., Monroe, La. ★ Layne-New York Co., New York City ★ Layne-Northwest Co., Milwaukee, Wis. ★ Layne-Ohio Co., Columbus, Ohio ★ Layne-Pacific, Inc., Seattle, Wash. ★ Layne-Texas Co., Houston, Texas ★ Layne-Western Co., Kansas City ★ Layne-Minnesota Co., Minneapolis, Minn. ★ International Water Corporation, Pittsburgh, Pa. ★ International Water Supply, Ltd., London, Ontario, Canada ★ Layne-Hispano Americana, S. A., Mexico, D. F.

High-balling Down the Main Pike or Pulling Out of the Tough Spots

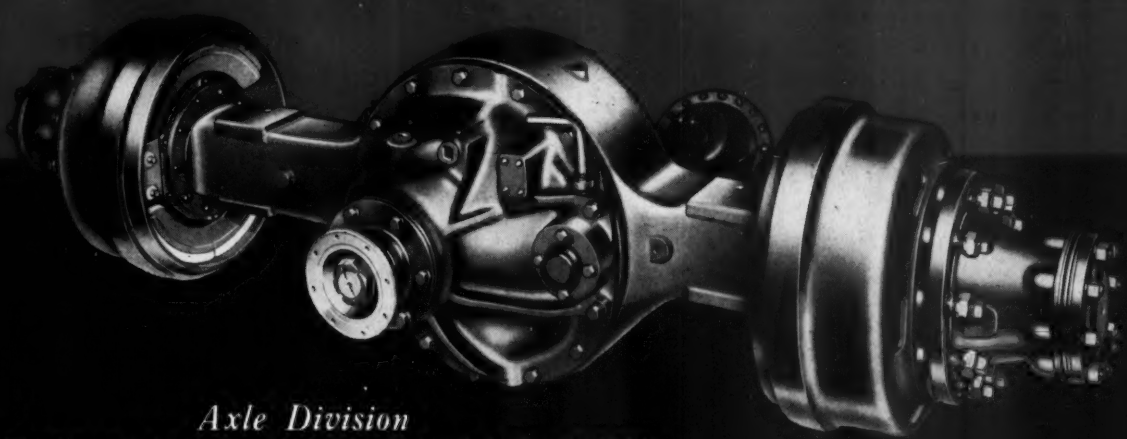
EATON

2-Speed Truck

AXLES

. . . give you the *exactly-right* gear ratio for every road, load, and type of service. There is no need to sacrifice speed for power—or power for speed. Eaton gives you BOTH—in the same vehicle with the same axle, available at finger touch to meet every specific operating need. And Eaton Axles actually pay for themselves, because they permit engines to operate at most efficient and economical speeds, reduce stress and wear on the entire vehicle, hold operating and upkeep costs to a minimum —and add miles to vehicle life. Eaton 2-Speed Axles are available for most trucks of the 1½ ton class and larger. See your truck dealer.

More Than a Million Eaton 2-Speed Axles in Trucks Today



Axle Division

EATON MANUFACTURING COMPANY

CLEVELAND, OHIO

OTHER EATON PRODUCTS

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XUM

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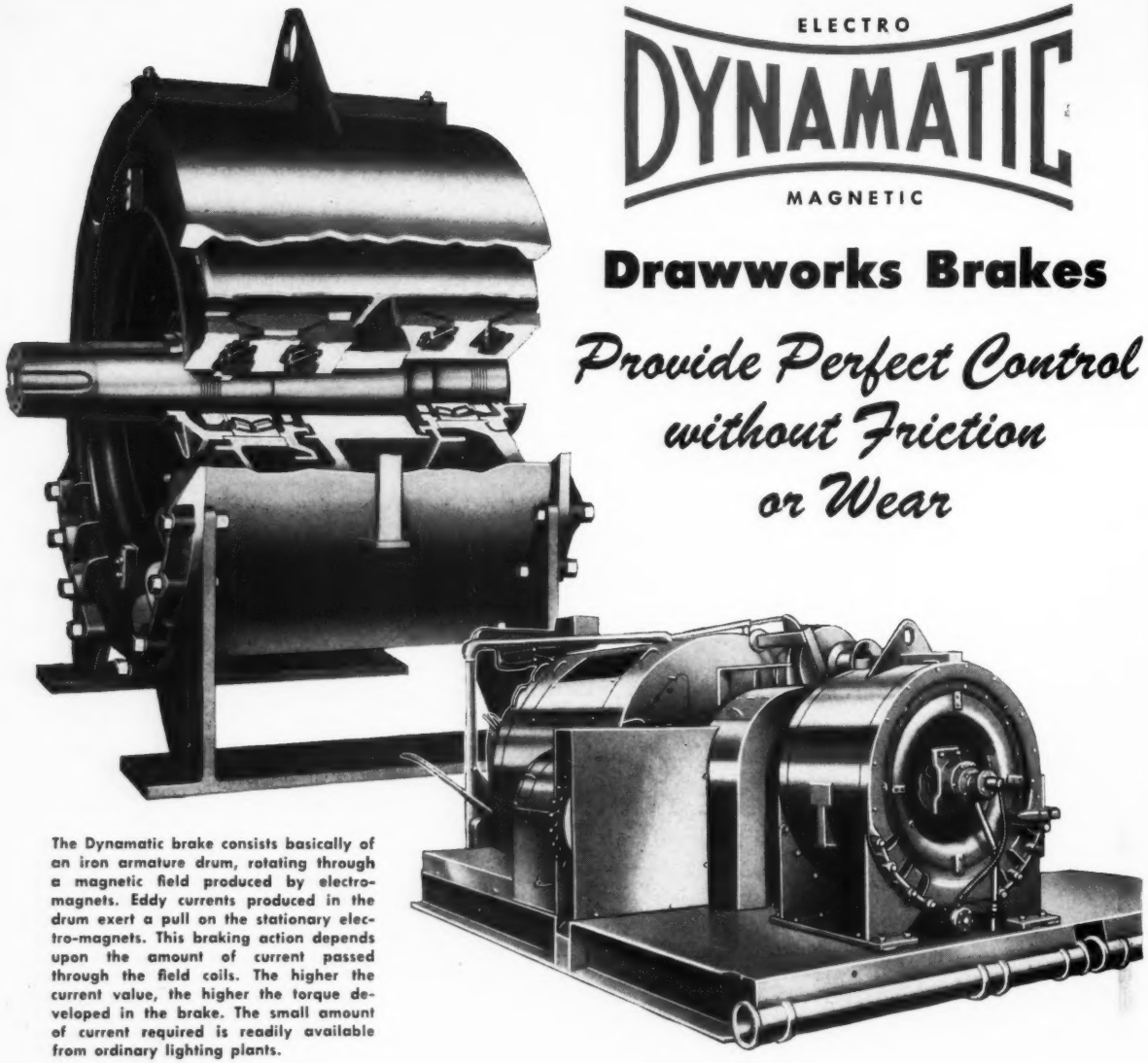
Drawworks Brakes

Provide Perfect Control without Friction or Wear



The Dynamatic brake consists basically of an iron armature drum, rotating through a magnetic field produced by electro-magnets. Eddy currents produced in the drum exert a pull on the stationary electro-magnets. This braking action depends upon the amount of current passed through the field coils. The higher the current value, the higher the torque developed in the brake. The small amount of current required is readily available from ordinary lighting plants.

THE Dynamatic electro-magnetic drawworks brake provides a braking effect which is variable and controllable through a range from 800 rpm to a drum speed slow enough to set slips on the heaviest strings of drill pipe or casing, without the assistance of the friction brake. Mounted similarly to the hydraulic type brake, the Dynamatic drawworks brake is comparable in size and weight. Energy absorbed by the brake is converted into heat, and dissipated in the cooling water. Remote control at the driller's position permits ease and speed of operation.

Outstanding characteristics of the Dynamatic brake are high torque at low speeds, and the complete absence of friction or wear, except on bearings, which have been designed oversize to permit continuous operation for years.

The Dynamatic brake is readily applied to practically all drilling rigs.

Sales Representatives: **GRIBBIN AND BAYLOR** Los Angeles • Houston • Fort Worth

DYNAMATIC **CORPORATION** • KENOSHA, WISCONSIN

Subsidiary of **EATON MANUFACTURING COMPANY** *Cleveland, Ohio*

General Offices: CLEVELAND, OHIO. *Plants:* CLEVELAND • MASSILLON • DETROIT • SAGINAW
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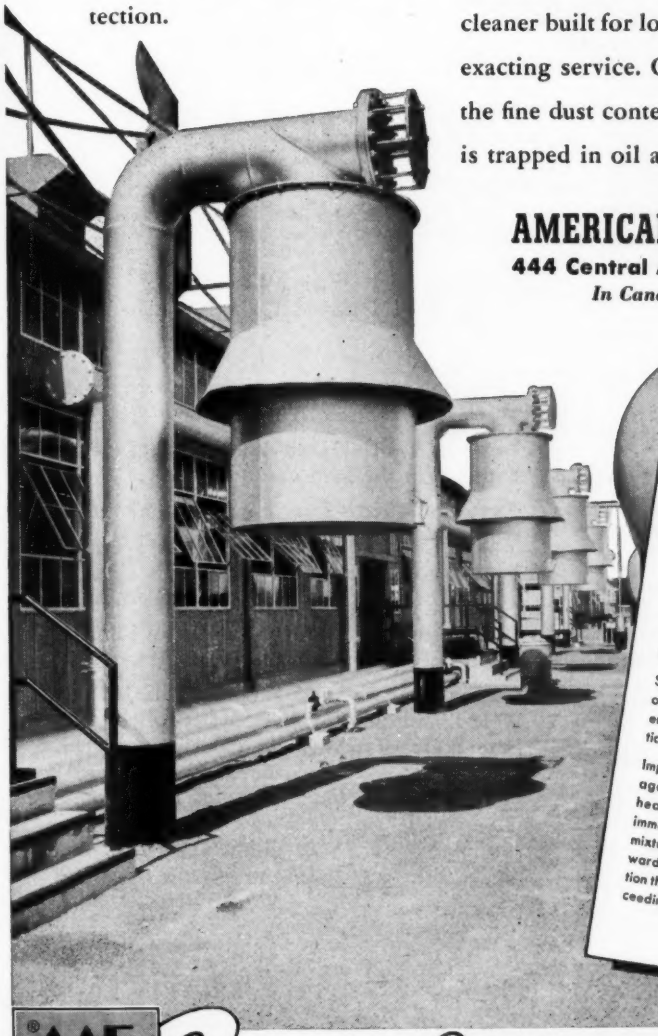
Cycoil protects engines from D.T.'s*

SHUTDOWNS, costly repairs, lost operating time —all may be symptoms of *Dust Troubles. And every engine or compressor is susceptible to this airborne affliction unless given positive intake air protection.

Experienced operators have found the Cycoil† Oil Bath Cleaner to be the best preventive medicine against dust damage. Cycoil delivers practically 100% dust-removal efficiency —it's a heavy-duty oil bath cleaner built for long wear and exacting service. Over 90% of the fine dust content in the air is trapped in oil and removed by centrifugal action before reaching the filter. Additional action of filtering pads plus positive oil circulation for self-cleaning action gives approximately 100% dust-free air.

Cycoil's first-line protection against dust costs little compared to the investment it guards. For the facts, write to AAF for Bulletin 130-D.



AMERICAN AIR FILTER COMPANY, INC.
444 Central Avenue • Louisville 8, Ky.
In Canada: Darling Bros., Ltd., Montreal, P. Q.

†*Trade Mark registered U. S. Patent Office*

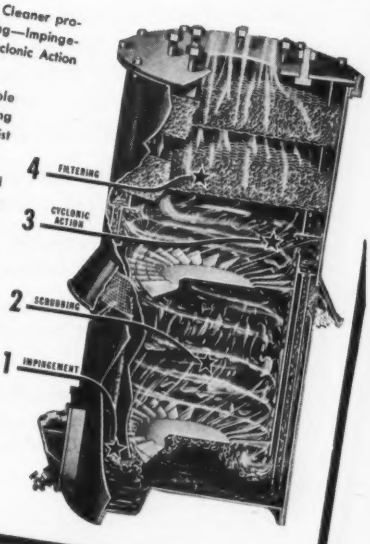
Cycoil Oil Bath Air Cleaner provides 4 way cleaning—Impingement, Scrubbing, Cyclonic Action and Filtering.

Filtration through Double Cells completes cleaning action eliminating oil mist from air.

Cyclonic action induced by vanes throws oil containing dust outward.

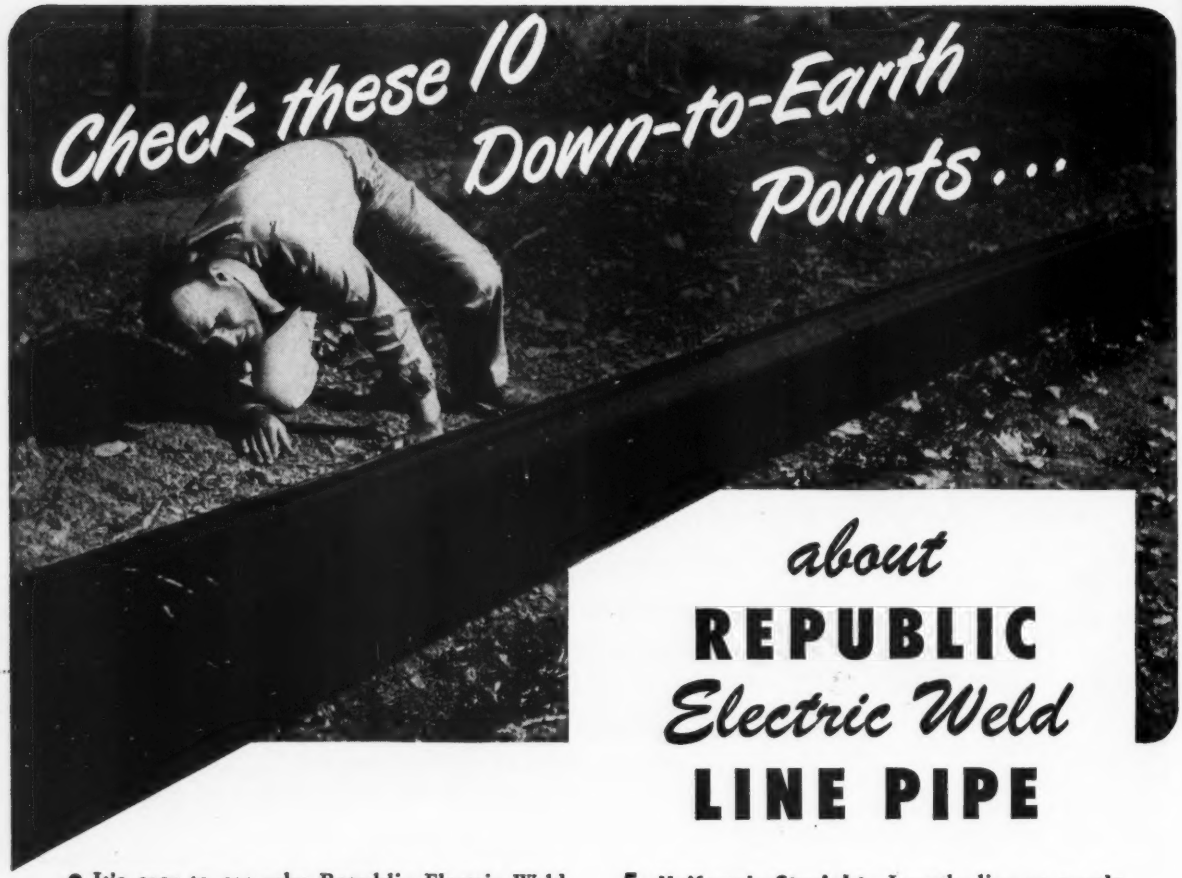
Scrubbing action, thoroughly mixes air and oil, entraining all dust particles.

Impingement of dirty air against oil, deposits the heavier dust particles immediately. Oil and air mixture then passes upward with whirling motion through vanes to succeeding cleaning steps.



AAF

Cycoil® OIL BATH AIR CLEANER AND INTAKE SILENCER



about REPUBLIC *Electric Weld* LINE PIPE

● It's easy to see why Republic Electric Weld Line Pipe goes in the ground fast and gives you long, trouble-free service. This *combination* of ten basic advantages is the reason. And, for this same reason, more than 51,000 miles of Republic Electric Weld Line Pipe have been placed in service over the past twenty years, carrying crudes, gasoline, natural gas and by-products.

1. **Uniform Roundness**—Pipe ends match up perfectly—speed construction—cut costs.
2. **Uniform Diameter**—No "off-size" lengths to cause welding difficulties at joints.
3. **Uniform Wall Thickness**—Absolute dependability throughout every inch of length and circumference.
4. **Uniform High Yield Strength**—Permits building of higher pressure lines—utilizing design values to fullest advantage.
5. **Uniformly Straight**—Lengths line up evenly—go into the ditch freely.
6. **Easy to Bend**—High-ductility steel makes bending in the field easy.
7. **Easy to Weld**—Low carbon steel welds readily—makes sound joints.
8. **Freedom from Scale**—Insures against clogged valves, contamination of petroleum products.
9. **Long Lengths**—Reduces number of joints—makes jobs move with longer strides.
10. **Inspected Inside and Out**—Republic Electric Weld Line Pipe is made from flat-rolled steel, both sides of which are closely inspected. Thus, you are assured that the surface which becomes the inside wall when formed into pipe is free from hidden defects.

Write for literature.

REPUBLIC STEEL CORPORATION
GENERAL OFFICES • CLEVELAND 1, OHIO
Export Department: New York 17, N. Y.

Republic
REPUBLIC STEEL
ELECTRIC WELD LINE PIPE

Other Republic Products include Casing and Tubing—Carbon, Alloy and Stainless Steels—Studs, Bolts and Nuts—Heat Exchanger Tubes

"I hate to brag, BUT last year, Eastman

Assisted the greatest number of oil operators in planning and executing exploratory **DIRECTIONAL DRILLING** work from artificial islands in the Gulf of Mexico, and developed new directional drilling technique and procedures for off-shore operations. Eastman really "Went to Sea."

Devised a method for securing **ORIENTED CORES** when the operator is using a conventional core barrel. This new service is accurate, speedy, and economical.

Developed and made available to oil operators a positive self-checking, mechanical type **DRIFT INDICATOR.** This new instrument does not use batteries or light-sensitive discs.

If you need some of the services, tools, equipment or experience which are listed, day or night, just consult your telephone directory!

Adapted the small **INSIDE SINGLE SHOT** so it could be dropped in a "Go-Devil" barrel inside the drill pipe. Used in conjunction with a non-magnetic drill collar, it saves the operator time and expense in securing directional survey readings.

Pioneered the combined use of an oil well diamond coring bit with the **EASTMAN REMOVABLE WHIPSTOCK.** In hard formations, this innovation saves time and reduces the delay of side-tracking operations.

22 OFFICES TO SERVE YOU

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DENVER . LONG BEACH . HOUSTON

OFFICES IN ALL MAJOR OIL FIELDS • CONSULT YOUR TELEPHONE DIRECTORY

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...with Du Pont DULUX Primers
REG. U. S. PAT. OFF.

Selection of the *right* primer is an important step in painting exposed steel structures. To provide a firm foundation for long-lasting intermediate and finish coats, the primer must be suited to the condition of the metal surface . . . whether it be scale-bearing, scale-free, or galvanized.

For maximum protection against corrosion, Du Pont has developed an extensive line of DULUX primers. Each of them is designed for a specific job . . . assures you optimum value based on the all-important yardstick of *cost per square foot per year*. Start the next job off right. Be sure that first coat is a DULUX Primer!

For technical advice on your painting problems, write to E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Wilmington 98, Delaware.

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BETTER THINGS FOR BETTER LIVING...THROUGH CHEMISTRY

FOR SCALE-BEARING STEELS:
67-800 DULUX Structural Primer

The 67-800 DULUX Primer has a high content of red lead modified with iron oxide. It is recommended for scale-bearing steel because of its unique wetting action. This action brings about intimate contact between the rust-inhibitive pigments and the irregular surface.

67-746 DULUX Zinc Chromate Primer

This primer incorporates zinc chromate as the rust-inhibitive pigment . . . is essentially the same wetting-action-type vehicle as used in 67-800. It has a similar degree of penetration into the crevices of scale-bearing steel.

FOR SCALE-FREE STEELS:
67-738 DULUX Primer

67-738 DULUX Primer is also a red lead-iron oxide reinforced pigment combination. In this product, the vehicle gives considerably faster drying time than that exhibited by 67-800 or 67-746. Applied to scale-free steel, this primer provides excellent resistance to corrosion, returning long-term durability.

67-754 DULUX Zinc Chromate Primer

This primer has drying characteristics similar to 67-738. Its rust-inhibitive pigment is zinc chromate, replacing the red lead.

FOR GALVANIZED SURFACES
67-744 DULUX Galvanized Metal Primer

This primer reduces the common paint failures on galvanized surfaces to a minimum. It has a neutralizing effect on galvanized metal. The formation of zinc compounds under the film, causing poor paint adhesion, is checked. Adhesion remains satisfactory even at low temperatures.

JONES SUCKER ROD COUPLINGS

To provide enduring trouble-free service, Jones sucker rod couplings are produced of selected steels to suit conditions under which they are used. Accurate alignment of face and threads is assured by precision threading, line reaming, tapping through the entire length in one operation, finishing within extremely close tolerances and inspecting. Threads, faces and shoulders of pins and couplings mate perfectly. Shocks, vibrations, load strains and stresses are resisted successfully. Case hardened and ground couplings offer a fine tough core to resist fatigue and a hard smooth wearing surface to withstand abrasion.

"LOOK FOR THE GREEN RODS"

JONES

SUCKER RODS

*Simplifying specification and ordering—the new Jones Catalog helps you get the right couplings for pumping requirements. Your copy will be sent on request.

***THE S. M. JONES COMPANY**

(Subsidiary of Buffalo Bolt Company)

General Office and Factory: TOLEDO, OHIO

Sales Office: McBirney Building, Tulsa, Okla.

Export Sales Office: Buffalo International Corp. 50 Church Street, N. Y. C.

KEY TO MORE

Unit Responsibility

YOU CAN BE SURE... IF IT'S Westinghouse

Driller's station on a modern Diesel-electric rig. The four sturdy control wheels give the operator complete control of the four generators independently—for various drilling operations, or combined for hoisting. "Drill-hoist" and "Emergency-stop" pushbuttons are located at the driller's station.

FROM DRILLING RIG TO SERVICE STATION... PRACTICAL HELP ON ANY ELECTRICAL OR POWER PROBLEM

From spudding-in to final delivery of the finished product, Westinghouse engineers have worked hand in hand with petroleum engineers to work out constantly new and better ways of doing things.

Today's fast, efficient a-c and d-c powered electric rigs are just one example of this partnership. The same single-source responsibility for putting power to work more profitably extends through improved pipeline pumping methods . . . steam gearing and electrical equipment for loading barges and tankers . . . ship propulsion drives and electrification from stem to stern, for modern tankers . . . refinery power and processing equipment . . . modern equipment for efficient marketing of petroleum products.

You will find Westinghouse Petroleum Industry engineers ready with practical suggestions and help on any power or electrical problem you have. Consult your nearest Westinghouse office. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pa. I-94731

XUM

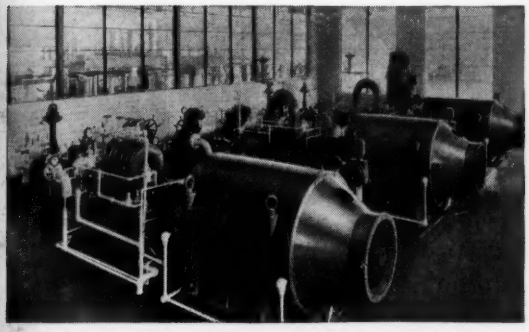
PRODUCTIVE POWER

"WESTINGHOUSE-EQUIPPED THROUGHOUT" MEANS SIMPLIFIED ORDERING, QUICKER INSTALLATION, MORE EFFICIENT OPERATION

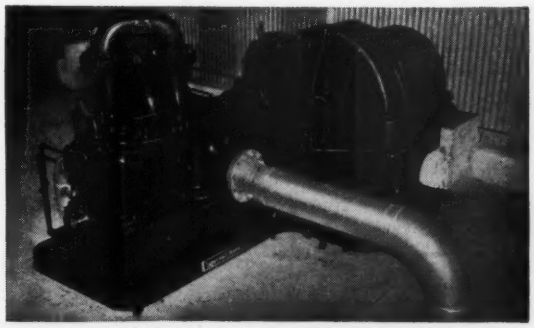
Putting power to work *productively* can be a major problem—or a simple one. When items must be selected, ordered and received from many sources, it means many chances for costly errors and delays . . . divided responsibility—or none at all—for performance of installed equipment.

Westinghouse offers the way to simplify the job. From equipment for generation of electrical or steam power, to the most specialized types of drives and control for its utilization, Westinghouse provides a single source of supply . . . one broad pair of shoulders competent to take responsibility for performance of all parts of the job.

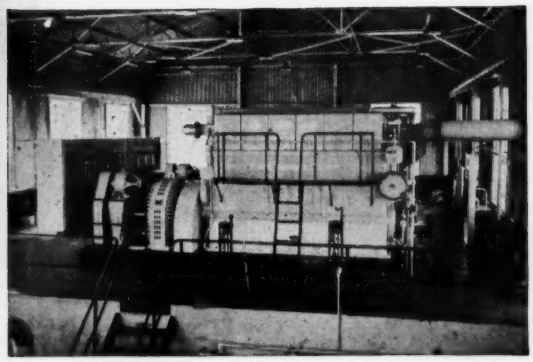
Here are a few of the places where Westinghouse unit responsibility prevents headaches . . . saves money . . . assures *more productive* power:



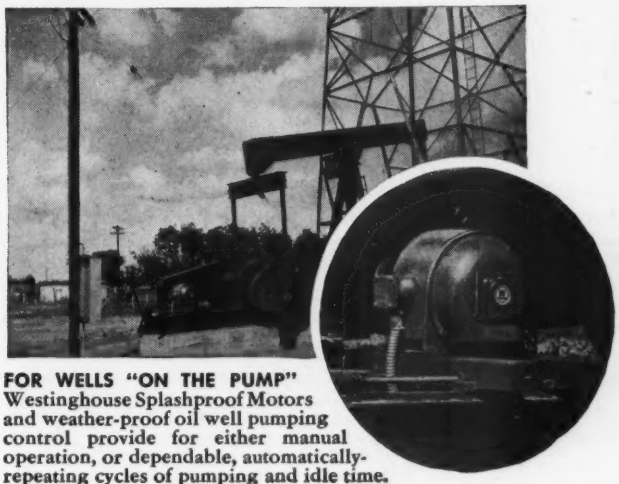
PIPELINE PUMPING. There's broad electrical background and petroleum industry "know-how" behind these explosion-resisting, pump-drive motors on an important products line. These are 3 of 65—the largest of their type, with ratings from 450 to 900 hp.



STEP-UP GEARING. Where internal combustion engines are used for drives, Westinghouse Step-up Gear Units boost shaft speeds to the right rates for efficient, economical pump operation. Photo shows three Westinghouse Type SU Speed-Increasers coupled between engines and pumps.



SWITCHGEAR AND POWER PLANT. Auxiliary power generating plant serving the world's largest natural gas transmission line. Gas engines drive the Westinghouse A-C Generators and Exciters. Westinghouse Switchgear controls the generators and distribution circuits.



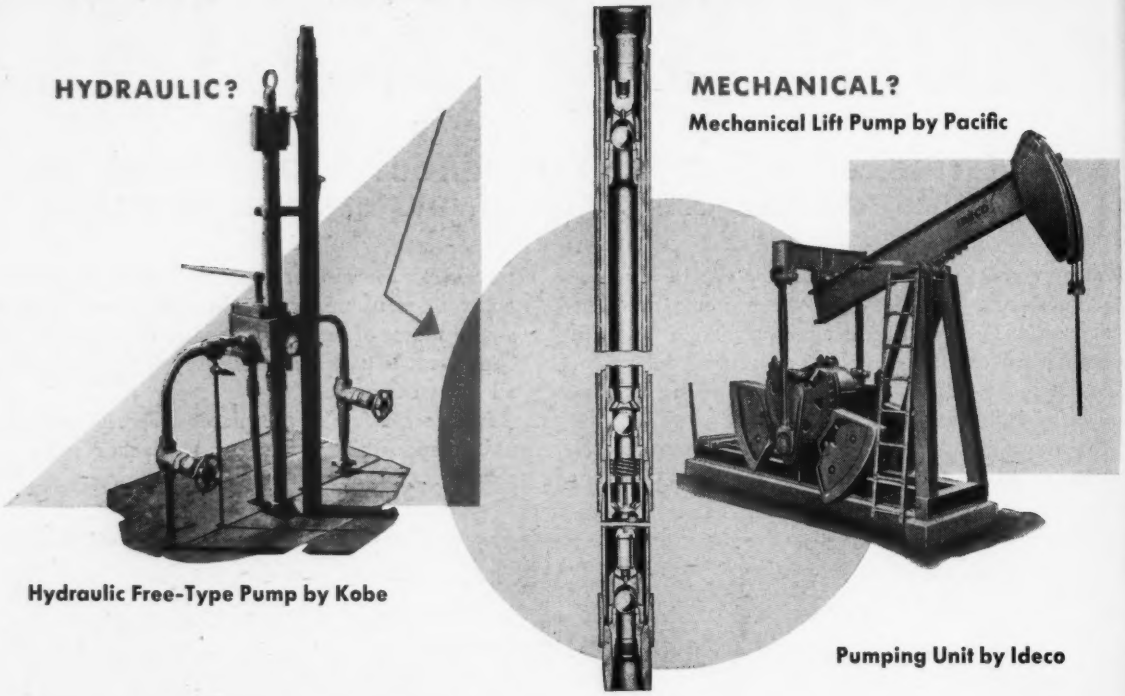
FOR WELLS "ON THE PUMP" Westinghouse Splashproof Motors and weather-proof oil well pumping control provide for either manual operation, or dependable, automatically-repeating cycles of pumping and idle time.

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MORE PRODUCTIVE POWER FOR INDUSTRY

XUM



AT THE AREA OF OVERLAP

you need decision, not persuasion

Because all wells are different, no one type of pumping equipment will serve every well best.

Your well may pay off best with the Kobe Free-Type hydraulic pump or it may pay off best with the Pacific mechanical lift pump. How can you know unless you investigate both from impartial salesmen? In engineering there are always areas where types of equipment overlap. A decision has to be made. You need unprejudiced engineering at this point, not persuasion in favor of the one type which a salesman has to sell.

Dresser Industries provides alternate types of equipment. You get engineering advice that does not compromise for the sake of a sale. Before you buy any pumping equipment, write for comparative data on Dresser's two pumping methods. State the depth and location of your wells.

HYDRAULIC—Turn a valve, and pump surfaces itself with no further effort. One man, in half an hour, does conventional job of four men in eight hours. Tremendous saving on operating costs. Write for details on free-type pump.

MECHANICAL—Ideco Units have more prized features than any other make: needle bearings for saddle, equalizer and hanger, pressure-lubricated; roller-type bearings for wrist pins with individual Alemite fittings; reducers with precision-cut, herringbone gears operated in oil bath. And more—write for Bulletin P-45.

Pacific deep-well pump line meets every condition. The quality comes from features no other company can afford to offer. Get acquainted also with Pacific's exclusive Regrinding policy. It resulted in one customer's yearly pump cost averaging only a fraction of competitor's. Write for details.

BOVAIRD & SEYFANG Mfg. Co.
Bradford, Pa.

CLARK Bros. Co., Inc.
Olean, New York

DRESSER Mfg. Division
Bradford, Pa.

DRESSER Mfg. Company, Limited
Toronto, Ont., Canada

INTERNATIONAL Derrick & Equipment Co.,
Beaumont & Dallas, Texas; Torrance, Calif.;
Columbus, Marietta & Delaware, Ohio

DRESSER
INDUSTRIES, INC.
TERMINAL TOWER • CLEVELAND 13, OHIO

KOBE, Inc.
Huntington Park, Calif.

PACIFIC Pumps, Inc.
Huntington Park, Calif.

ROOTS-CONNERSVILLE Blower Corp.
Connersville, Ind.

SECURITY Engineering Co., Inc.
Whittier, Calif.

STACEY BROS. Gas Construction Company
Cincinnati, Ohio

Stacey-Dresser Engineering Division
Cleveland, Ohio

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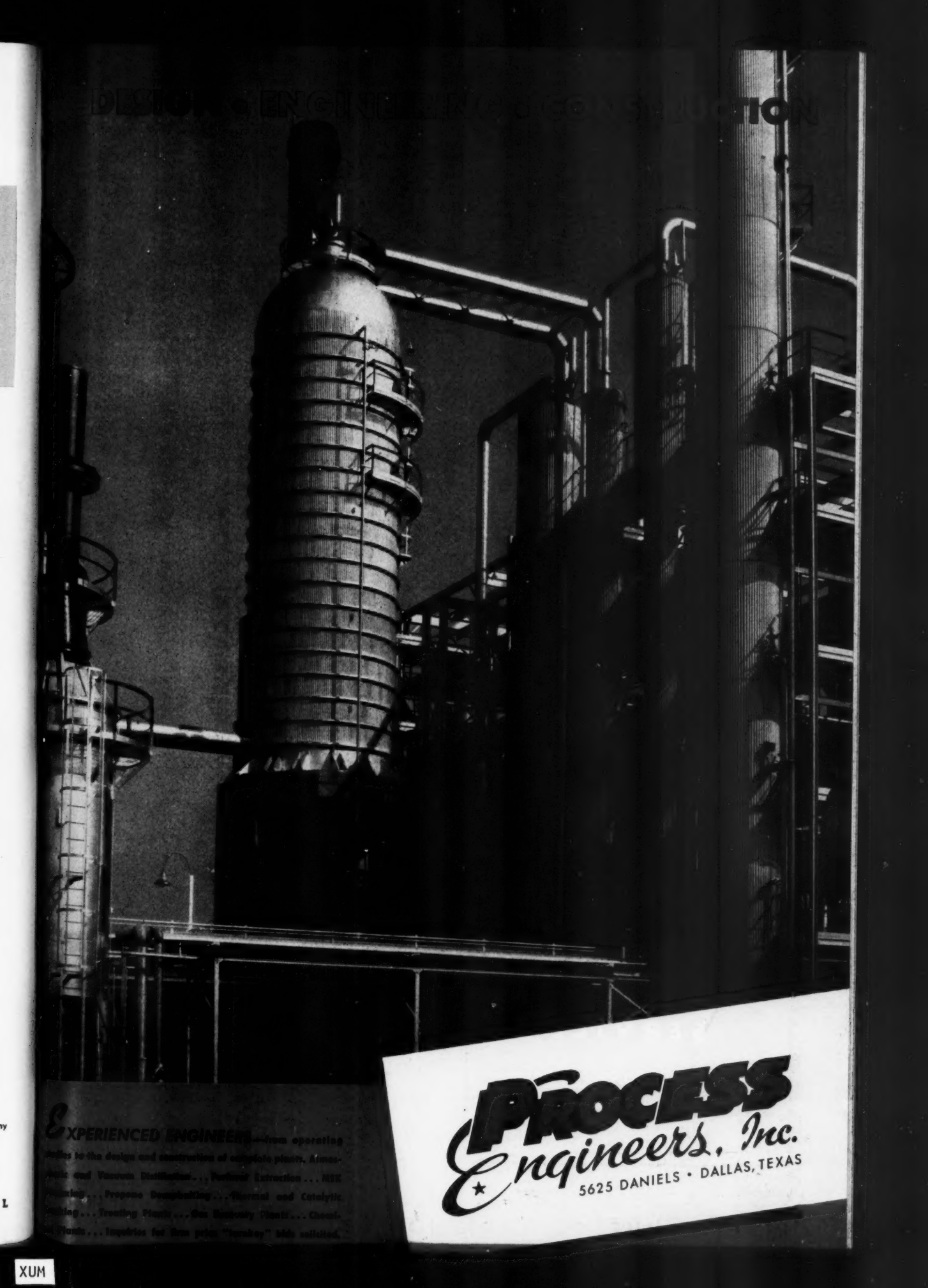
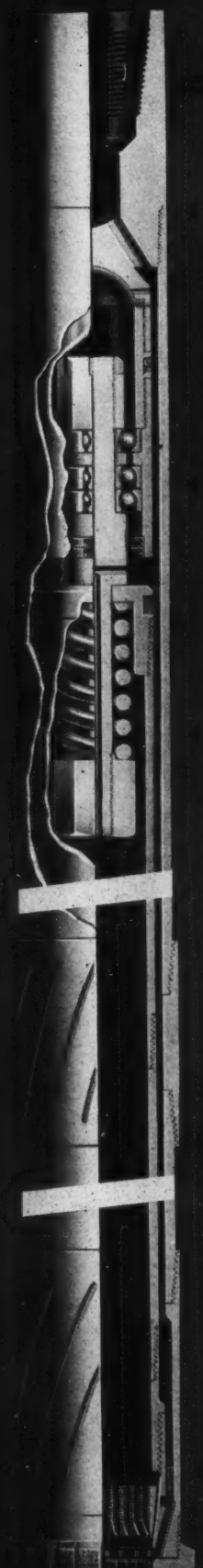

PROCESS
Engineers, Inc.
5625 DANIELS • DALLAS, TEXAS



DRILLING
&
SERVICE
INC.
3027 Elm Street, Dallas 1, Texas

Stocks in
Dallas · Shreveport · Odessa · Lindsay · Caspar

. . . holds a pre-set bit weight accurately on any rotary rig—increases bit life and bottom-hole time—assures maximum drilling speed at less cost!

Here's G-E's new *Automatic* Bit-weight Control, designed to hold any pre-selected weight on the bit accurately and automatically—regardless of drilling speed. Whether your rotary drilling rig is electrical, mechanical, or steam, automatic bit-weight control will give you these outstanding advantages.

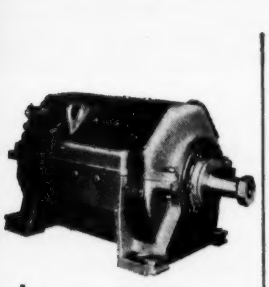
STRAIGHTER HOLES that get to the oil faster and cost less to drill.

LONGER BIT LIFE that cuts round trips for bit replacement and increases bottom-hole time.

SIMPLER CONTROL that permits your driller to give more time and attention to other duties.

MAXIMUM DRILLING SPEED that comes from automatically maintaining the right weight on the bit.

A new bulletin, complete with schematic diagrams, describes automatic bit-weight control. Send for your copy today.



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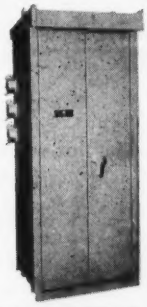

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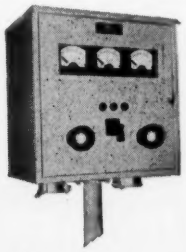

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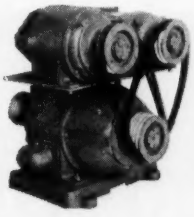
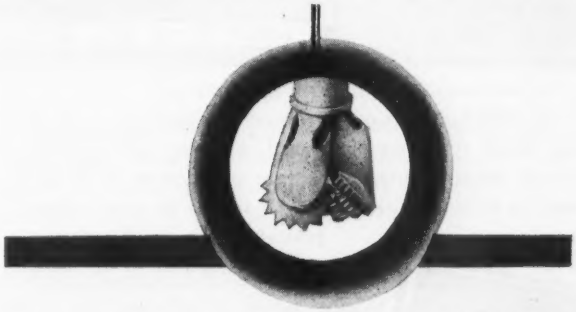


4.

Only 4 Main Parts to the System: (1) Drag generator—a 15-hp, 725-rpm, Type MD-604 motor—connected to the draw-works through a speed reducer. (2) Main control panel, enclosed in weatherproof cabinet. (3) Operator's control panel. (4) Amplidyne-controlled regulating generator and exciter.



General Electric Company, Section C 654-84
Apparatus Department, Schenectady 5, N. Y.

☐ Please send me Bulletin GEA-5055, Automatic Bit-Weight Control.

☐ In addition, please send me Bulletin GES-3485 which describes *Lease on the Future*, G-E's MORE POWER TO AMERICA film on oil-field electrification.

Name_____

Company_____

Address_____ City_____ State_____

GENERAL ELECTRIC

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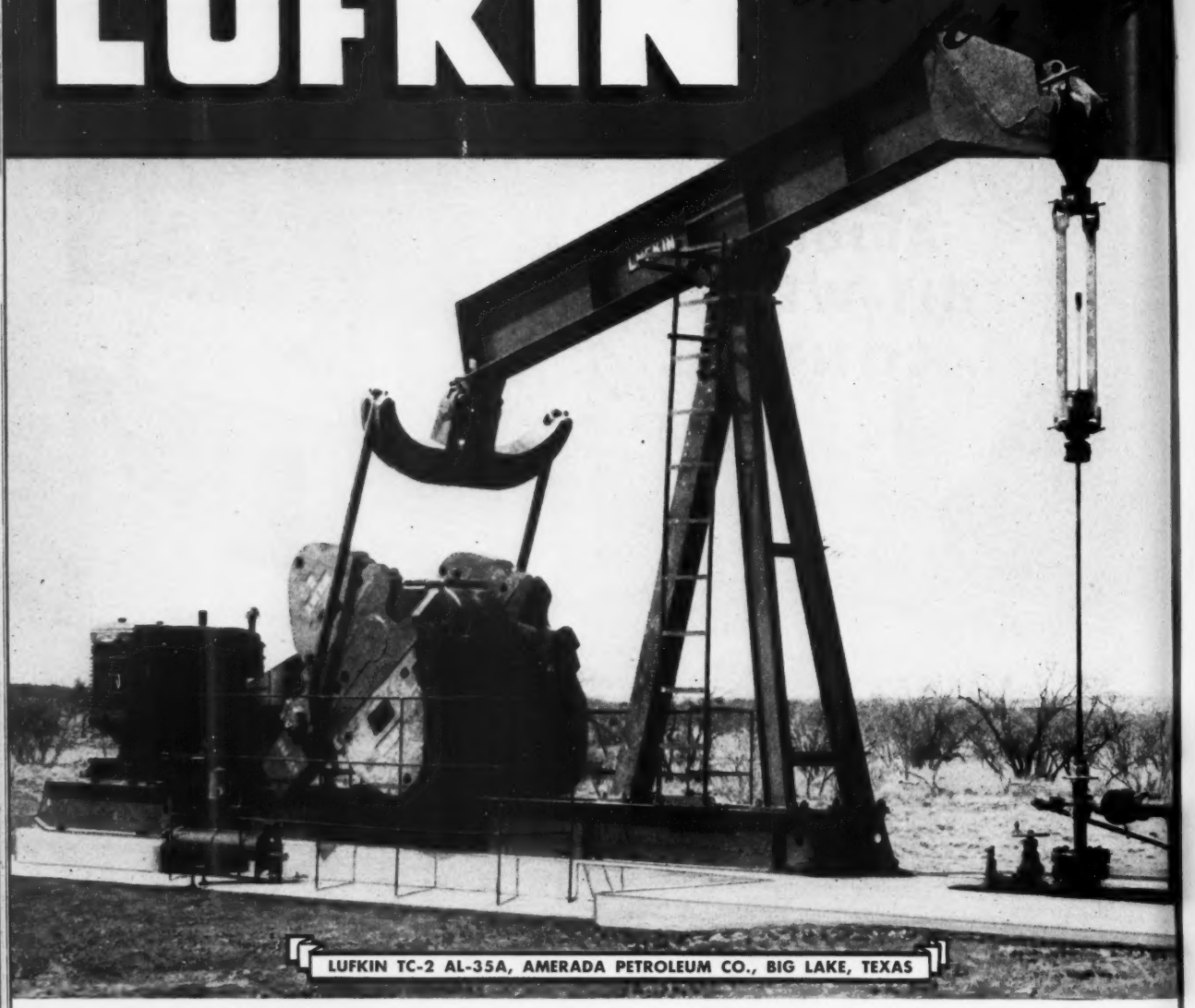
LUFKIN



LUFKIN TC-2 AL-35A, AMERADA PETROLEUM CO., BIG LAKE, TEXAS

In 1948 Lufkin, world's largest manufacturer of walking beam type pumping units, exceeded all previous yearly installation records since production of its first unit in 1923 and—indications point to an even greater achievement in 1949.

Oil producers have recognized Lufkin's leadership in its respective field and have relied upon its engineering staff to supply equipment to meet exacting requirements.

Special Engineering skill—the result of more than a quarter of a century experience, enables Lufkin to do the job in a fashion not quite obtainable elsewhere.

More Operators Are Scheduling Installations of the Lufkin Line in '49 Than Ever Before.

More than 60,000 commercial gear reducers and speed increasers—in full-line range of sizes, have been produced in our Lufkin plant under the supervision of men with more than a quarter of a century experience. Write for our latest catalog!

FOUNDRY AND MACHINE CO., LUFKIN, TEXAS

Branch sales and service Houston, Dallas, New York, Tulsa, Los Angeles, Semino Oklahoma City, Corpus Christi, Odessa, Kilgore, Wichita Falls, Casper, Wyomi Great Bend, Kansas.

LUFKIN

LUFKIN COOPER BESSEMER

LUFKIN OIL FIELD AND INDUSTRIAL

INDUSTRIAL SPEED REDUCERS

DIVISION LUFKIN FOUNDRY & MACHINE COMPANY

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Only GMC DIESELS GIVE YOU ALL THESE FEATURES

SPECIALLY ENGINEERED DIESEL CHASSIS

- Wide track front axle
- Straight frame side rails
- Heavy duty clutch and cast 2-shoe air brakes
- Syncro-Mesh transmissions
- Two-speed, double reduction and dual drive rear axles
- Weight ratings up to 90,000 pounds

FAMOUS GM 2-CYCLE DIESEL ENGINES

- Direct triple duty injectors
- "Uniflow" scavenging
- Full-Flo lubrication
- Triple-cooled pistons
- Pressurized water circulation
- Thermostatic water by-pass and radiator shutters

Why are GMC Diesels handling an increasing number of heavy hauling jobs in many industries?

First, because GMC builds the widest range of 4- and 6-cylinder Diesel trucks available today . . . with a choice of eight basic models . . . with axle and transmission ratios to meet every type of hauling, over-the-road and off-the-highway.

Second, because GM 2-cycle Diesel engines provide *twice* the number of power strokes as conventional 4-cycle types. This means less engine weight . . . greater payloads . . . smoother performance and increased efficiency.

For all that's new and best in Diesels, look to GMC . . . pioneer in Diesel truck and coach production.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

THE TRUCK OF VALUE

GMC TRUCKS

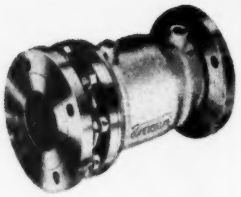
GASOLINE • DIESEL

IN THE CONTROL OF . . .

AIR . . . . . GAS . . . . . LIQUIDS

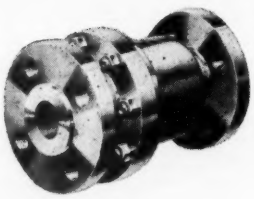
GROVE takes the new approach to old problems

Since its inception, Grove Regulator Company has pursued the course of developing new and better means of solving old problems. Research, a basic and essential part of this long range program, has been directed by practical field experience. The rapid strides of Grove in the sphere of fluid control reflect the tested and proved principles embodied in Grove products. Typical of such outstanding Grove developments are those shown.



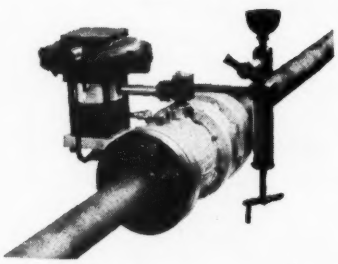
FLEXFLO

Expansible tube type valve for cold fluid services, handles oil, water, solutions, gases and air. Corrosion and erosion resistant. Self-operating by various remote control combinations.



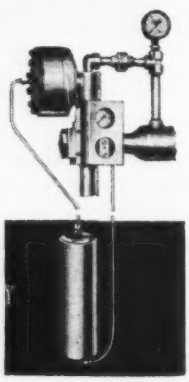
CHEXFLO

Fully self-contained, self-operating check valve, closes on balanced flow prior to the start of return flow. Ideal for handling corrosive fluids or gases. Bubble-tight shut-off, no metallic moving parts.



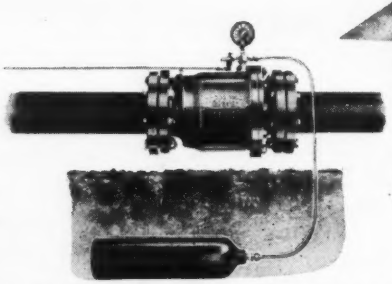
MODEL 898
SEPARATOR OIL VALVE

Pressure-balanced operation with closed actuating system sealed off from line fluid. Self-compensating for wear, handling the most abrasive fluids. No seep or leak—just set it and forget it.



MODEL PB-300
REGULATOR

For severe services, as a back pressure or pressure reducing regulator, stands up to toughest conditions. Working parts protected from gas blast, resists freezing or sand cutting. Handles pressures up to 6000 lbs. reducing, 3000 lbs. back pressure service.



MODEL 888 PRESSURE LOADED RELIEVER

Instant response to slightest variation in line pressure, opens and closes smoothly with no sticking, chattering, leakage or failure. Equally suitable as Back Pressure Regulator opening on constant or intermittent flow.

GROVE REGULATOR COMPANY *65th & Hollis Street, Oakland 8, California*

3608 Navigation Blvd., Houston, Texas • 1930 W. Olympic Blvd., Los Angeles 6, California

GROVE

GROVE
SIMPLICITY
ACCURACY
SAFETY

Pressure and Flow Control
SYSTEMS & EQUIPMENT

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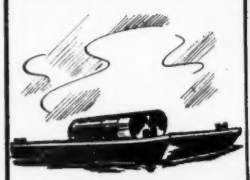
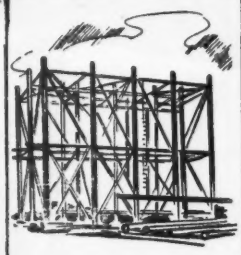
CONVERSION
From WAR to OIL—all types of craft.

AVONDALE is Ready

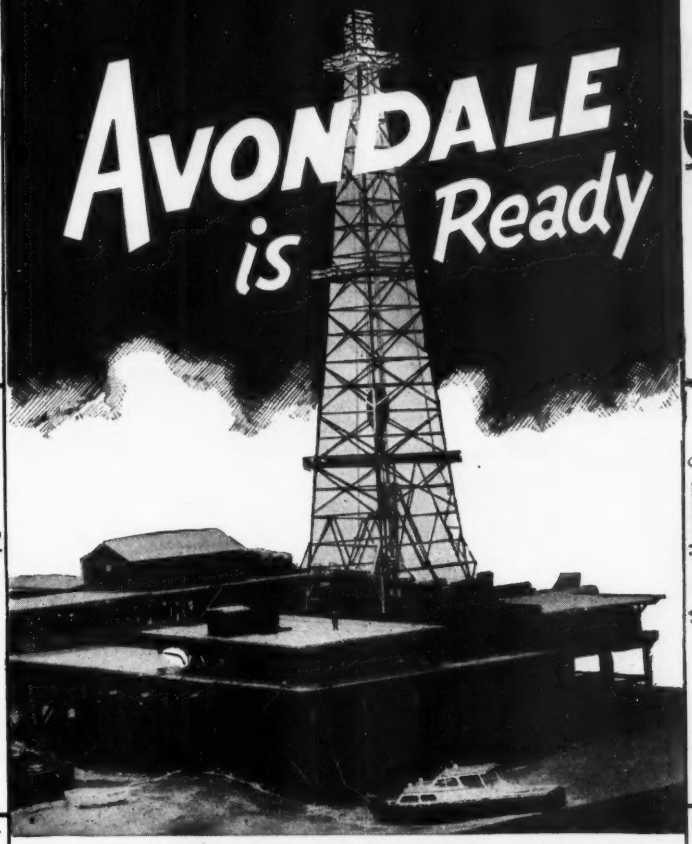
LAUNCHES
For personnel or work use. Swift, efficient!



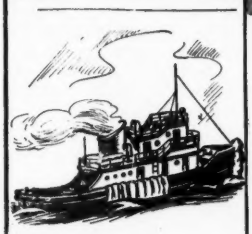
BARGES
All types built or repaired.



PLATFORMS
For offshore drilling.



PICTURED ABOVE: Scale Model of Offshore Drilling Platform as on Display in International Trade Mart, New Orleans



TUGBOATS
Ask us about any type or size.

TO MEET YOUR NEEDS FOR OFFSHORE DRILLING

You can truly say the AVONDALE has "one-stop-service" for your marine requirements. Builders of tugboats and towboats and barges . . . converters of LST's and other wartime craft for Oil use . . . and already famous as fabricators of drilling platforms—AVONDALE *is ready* to meet your needs for offshore drilling. Call or write today!

FABRICATION
Steel is our tool—we know how to work with it!

STEEL

AVONDALE MARINE WAYS, INC.

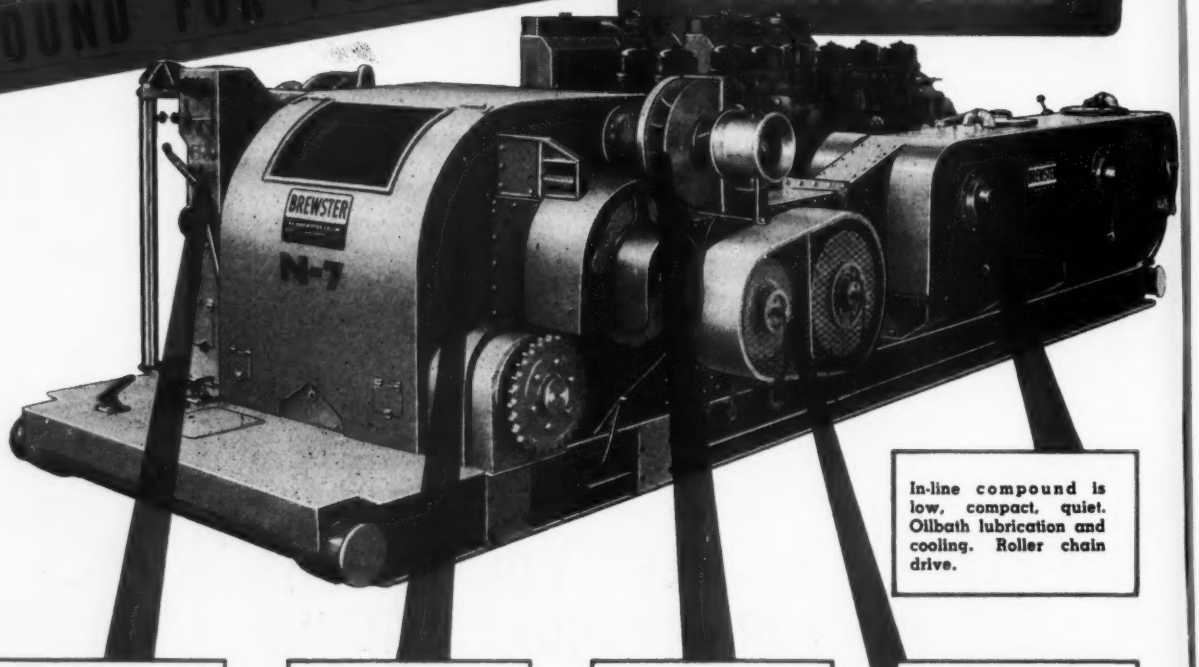
RIVER FRONT, MAILING ADDRESS: NEW ORLEANS DISTRICT WESTWEGO, LOUISIANA

MAIN PLANT: AVONDALE, LA.
QUICK REPAIR PLANT — HARVEY, LA.

MORE POWER

POUND FOR POUND . . .

BREWSTER N-7 DRAWWORKS



In-line compound is low, compact, quiet. Oilbath lubrication and cooling. Roller chain drive.

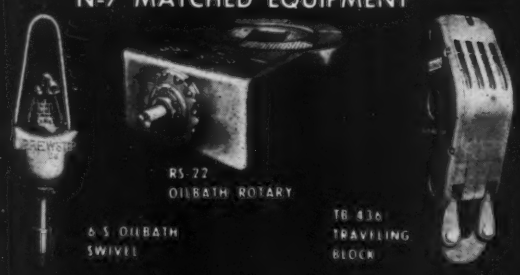
All controls air operated from central control panel. Overall height of N-7 shell is only 55".

Full wrap 9" x 46" brakes are self-energizing and equalized. Hydraulic or electric brake optional.

500 H. P. transmission is integral part of drawworks. Has 4 forward speeds; 2 reverse. 12 line, 6 rotary speeds.

Friction clutches throughout. Motors may be separated for individual operation of pump and drawworks.

N-7 MATCHED EQUIPMENT



FOR 7500′ DRILLING

The Brewster N-7 Drawworks offers speeds, safety, and ease of operation. Unitized on a single skid, the N-7 is compact, easy to move. Entire unit is one trailer load. The N-7 Team of perfectly matched equipment offers maximum drilling efficiency and economy. Write today for complete information.

The BREWSTER CO., Inc.

Manufacturers of Drilling Equipment Since 1910

SHREVEPORT, LOUISIANA, U.S.A.

BREWSTER
Drilling Equipment

HALEY SUPPLY CO.

BAIRD SUPPLY CO.

XUM

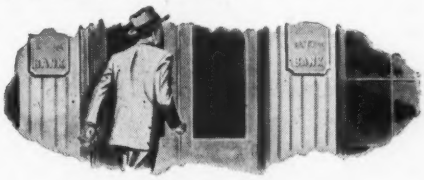
WHY ARE YOU IN THE OIL BUSINESS?

THE *real* reason you're in the oil business is to make money . . . isn't it?

Well, do *you* know any better way to *make* money than to *save* money?

You can save *plenty* of money with trucks that fit your job . . . Dodge "*Job-Rated*" trucks.

It stands to reason that you waste money with a truck that's too big for its job; and you're in for plenty of costly maintenance expense if your trucks are too small.



From 248 basic chassis models, your Dodge dealer can specify a truck that will be "*Job-Rated*" exactly for your hauling job.

Such a truck will have the right one of seven great truck engines . . . for top efficiency and maximum economy. It will have the right units throughout . . . to haul *your* loads, over *your* roads.

And remember . . . only Dodge builds "*Job-Rated*" trucks. Talk to your Dodge dealer!

For the good of your business—

Switch to DODGE "Job-Rated" TRUCKS

All-Around efficiency...

with ALL-WELDED ALUMINUM by Stacey Brothers

All-aluminum vessels can cut many a processing cost—by cutting maintenance and replacement expense.

The key to such savings is thick-section (up to 3″) aluminum welding. Stacey Brothers has that key—ready to place at your disposal. We are equipped to handle your requirements for all-welded aluminum pipe and made-to-order fittings 12″ diameter and over; and special vessels are a proved product at Stacey Brothers—with applications limited only by your needs.

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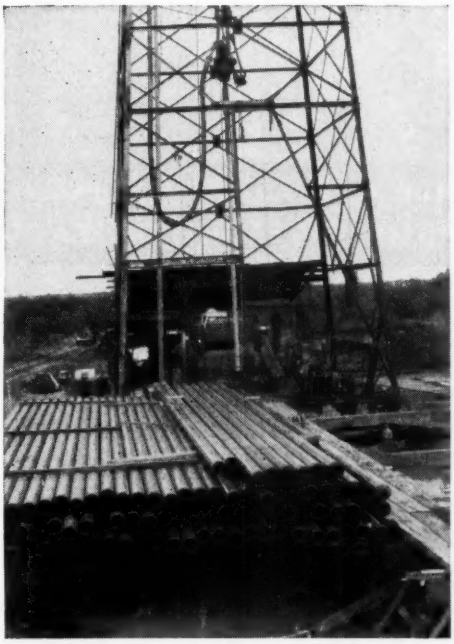
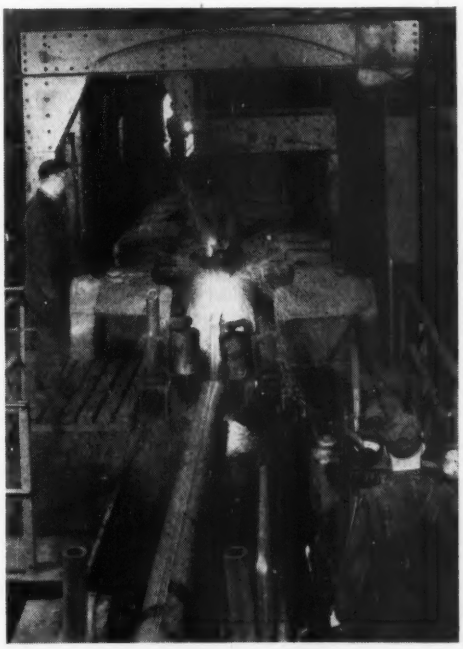


IN A TEXAS FIELD: running 4300 feet of 7-inch S-80 SMITHway Casing.



IN THE A. O. SMITH PIPE MILL: this automatic flash-welding machine, developed by A.O. Smith research, simultaneously welds SMITHway Casing along its full length.

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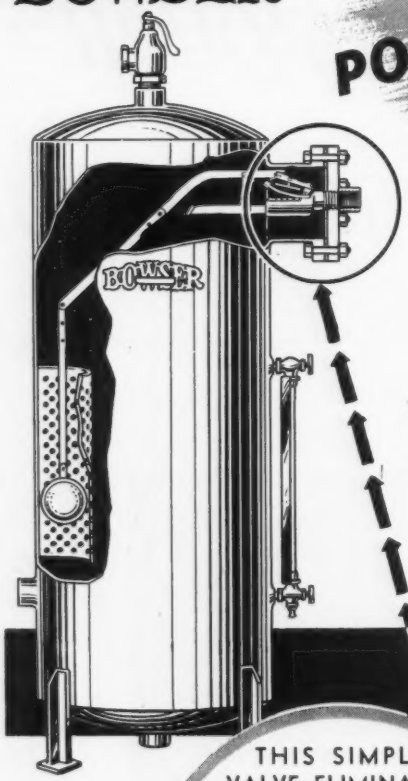

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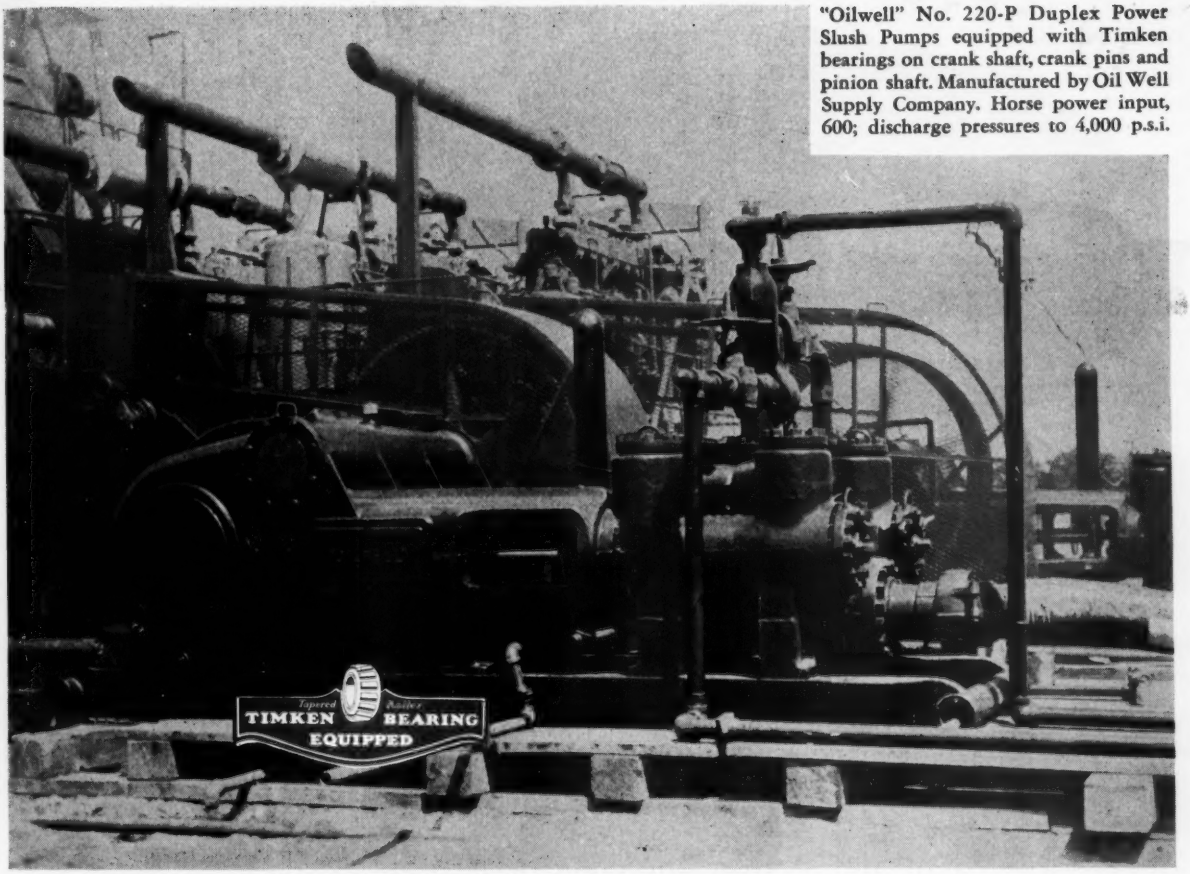

"Oilwell" No. 220-P Duplex Power Slush Pumps equipped with Timken bearings on crank shaft, crank pins and pinion shaft. Manufactured by Oil Well Supply Company. Horse power input, 600; discharge pressures to 4,000 p.s.i.

How To Make A Slush Pump Do A Better Job At Lower Cost

As oil wells go deeper and deeper a heavier responsibility constantly is being placed on slush pumps in keeping slush circulating steadily from pit to bit and bit to pit.

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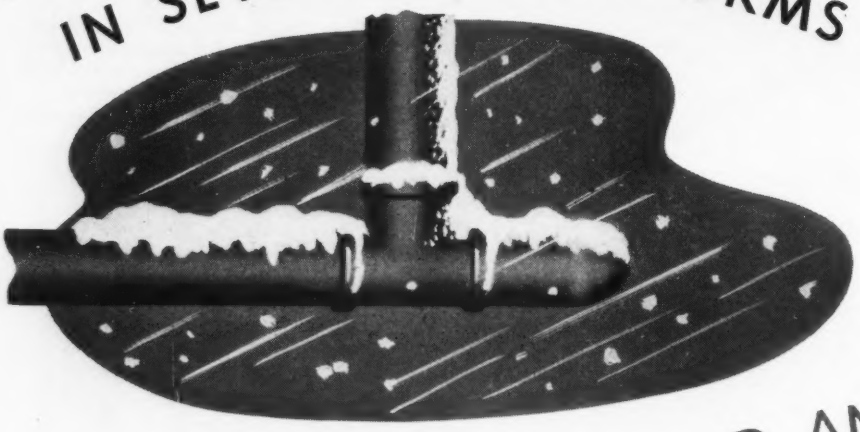
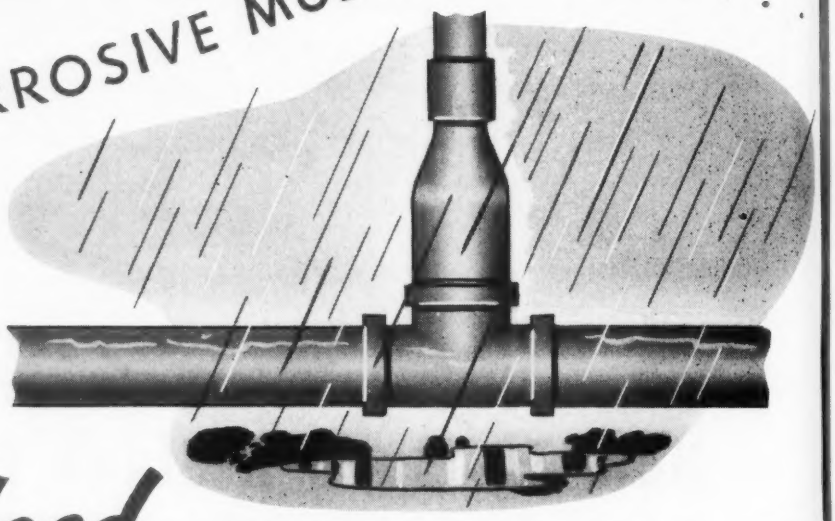
IN SEVERE SNOWSTORMS . . .



OR CORROSIVE MUD AND RAIN . . .



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JOURNALLY Speaking

Wet Plot

THERE is a campaign on in Oklahoma to ditch the prohibition amendment which was put in the constitution to protect the Red Man's morals from the White Man's firewater back when the state was created out of Indian Territory.

Oil men being what they are, a number of them have endorsed the idea. This has aroused the ire of supporters of the status quo who profess to see a plot by the oil industry to set up something else to be taxed and thus get some of the load off its own back. We have heard that some oil men are sufficiently unpatriotic to flout the constitution by taking a drink, but it certainly shows a sad lack of public spirit if they actually have gone so far as to suggest that some way be found to keep their taxes from being increased.

Compact Comment

THE Interstate Oil Compact Commission, whatever its achievements in oil conservation and state cooperation, shows a sad lack of meteorological savvy in picking the times and places for its meetings. Last August it convened in New York City in the midst of the hottest weather of the summer. Last December it hit Wichita during a typical Kansas cold snap. Its next meeting will be in Florida in May.

Now Florida is probably very nice in May, but what place isn't? With 20 states and 12 months to pick from you'd think they could score better than that. If they don't use a little more foresight the compacters may find themselves in Texas next July and Wyoming next January.

Schoolmaster Ickes

HAROLD L. ICKES, self-appointed crusader for federal ownership of tidelands, advances the argument that royalties from offshore oil should be used for the schools of the whole nation and not just those of the states which happen to border on the sea.

It's easy to see his objective here. With the federal Government doling out the money it could have the schools teach what it pleases, whereas Texas uses tidelands royalties to indoctrinate its youth with obsolete shiboleths such as that this is a union of sovereign states and that the federal Government is one of delegated powers only.

Television Wishin'

OUR new stenographer says she read that some of the major oil companies are the biggest users of television and isn't it wonderful how they use the latest scientific devices to find oil these days?

Interior Doubts

MEETING nothing but rebuffs from the oil industry on its proposal to build a chain of synthetic-fuels plants in the United States, the Interior Department is considering sneaking off to its own domain of Alaska and building a plant there to work on local coal. This shows a discouraging lack of faith that its sister department, the Navy, will have much luck in its current expensive wildcatting venture up there.

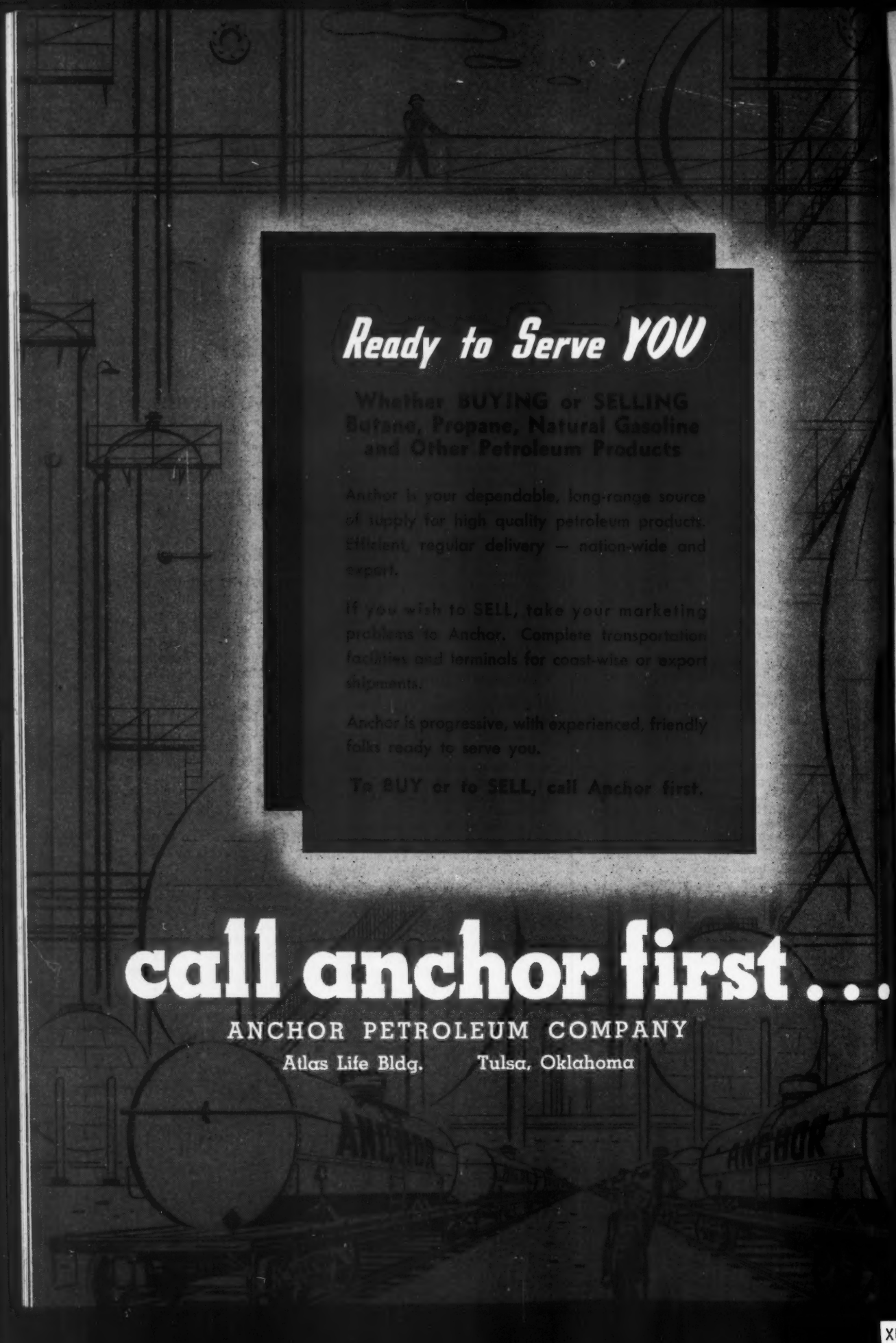
The Sky's No Limit

MAN in Chicago named Mangan has laid claim to all celestial space, excluding the earth, sun, moon, planets, and stars. Says he checked with the U. S. Naval Observatory and found nobody else ever filed a claim, so it's his. Being in the advertising business he has named it Celestia, and offers to sell hunks the size of the world for $1 each.

Mangan must have got the idea from the way Ickes laid claim to the Continental Shelf. Wonder if Texas will contest this trespass in its sky.

Paradox

A GLANCE at the federal budget suggests that Government is one enterprise which can successfully defy the laws of supply and demand. The more oil that's produced, the lower the price; but the more Government we have the more it costs.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XUM

CLEAN UP THE "WORKING SURFACE" OF YOUR CASING

Read these facts about the Baker Rotary Casing Scraper

Have you ever tried to run testing tools or a swab, and had the rubber packing unit or the rubber cups so badly cut, torn and mutilated that the run was a failure? The chances are that trouble was caused by burrs from gunshot holes or by the sheath of hardened cement or mud which remains on the inside walls of casing, even after a bit of maximum possible gauge has been used to drill out after a cement job.

Until quite recently there was no fast, simple method of overcoming these difficulties. Now, however, it is truly a waste of time, temper and money to leave any obstructions adhering to or protruding from the "working surface" of your casing. The Baker Rotary Casing Scraper quickly, positively and economically removes *all* obstructions from the inside walls of casing, leaving the surface clean and smooth—ready for *immediate* testing and completion—and in good condition for any remedial or work-over operations *one year or ten years in the future.*

STRONG, SIMPLE CONSTRUCTION

The Baker Rotary Casing Scraper consists of a strong body in which three long, reamer-type, hard-faced blades are vertically mounted. These three blades form an expansible reamer due to the fact that they are pressed outward against the inside walls of the casing by a number of coil springs. This self-equalizing feature insures constant, uniform contact with the walls of the casing, and is one of the secrets of the clean, smooth scraping action. Hard facing is applied in a flat, rectangular recess to form the long cutting edge of each blade, and a worthwhile amount of scraping can be done before the blades are dulled.

Ample circulating areas permit free disposal of cuttings; the streamlined exterior of the body insures ease in running-in; and if by accident the Casing Scraper is run out of the lower end of the casing, there is no difficulty in bringing it back inside for removal from the well.

FACTS ABOUT ITS USE

The ideal time to use a Baker Rotary Casing Scraper is while the rotary rig is still up and the crew is on hand. Install the Casing Scraper just above the bit when going in to drill out the cement shoe. Even when a bit of the maximum possible gauge is used for drilling-out, a thin, hard sheath (or skin) of cement will still remain adhering to the inside walls of the casing. The Baker Rotary Casing Scraper removes not only this hardened sheath of cement, but also scrapes away all mill scale, and smooths out rough areas. The inside of the casing is left clean and smooth, ready for trouble-free, down-hole work immediately thereafter, or at any future time.

If the well is gun perforated, then a second run of the Baker Rotary Casing Scraper will remove any burrs left around the gun-shot holes. The slight additional cost of this second run is negligible when you consider what the clean, smooth casing will mean when any future down-hole work is done.

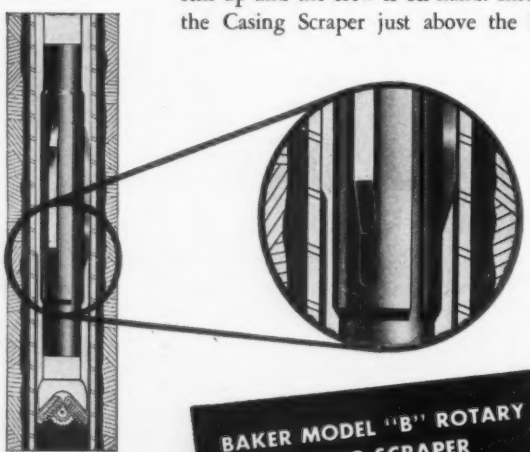
If at a later time, after the rotary has been removed, obstructions on the inside walls of the casing interfere with operations, the Baker Rotary Casing Scraper still can be employed successfully. By running the Casing Scraper on tubing, and rotating manually with tongs, limited areas may be scraped; while several hundred feet of casing have been scraped by rotation of the tubing with an endless spinning rope, or by means of air tongs.

IT'S EASY TO HAVE THE "WORKING SURFACE" OF YOUR CASING IN PERFECT CONDITION

Baker Rotary Casing Scrapers are furnished on a low-cost rental basis in domestic fields, and *your* crews can run them easily and successfully to scrape the "working surface" of the casing before running casing, tubing, liners, swabs, testing tools, cement retainers, packers or other similar tools. It pays off in savings of time, temper and money.—Why not call the nearest Baker service engineer and start enjoying these benefits in *your* wells?

(Left) With only four springs back of each blade, burrs from gunshot holes are readily removed.

(Below) Notice the "trouble-making" sheath of cement left behind the bit, and how the blades remove it.



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THE OIL AND GAS JOURNAL

Dry Bones

TALK of divorcing the several branches of the oil business and breaking up the integrated companies into constituent parts calls to mind a currently popular spiritual.

The theme of this song is that the human body is composed of a lot of dry bones, but when properly connected "dem bones gonna walk around." In other words, the life and animation that make an organism a going concern depend on integration.

Now it is perfectly true that there are many individuals and firms engaged in a single activity of the oil business, and most of them do pretty well. Integrated companies could be separated into "bones" and each part could survive, in a fashion. But the aggregation wouldn't look much like the present oil industry, and it wouldn't "walk around" very much.

Perhaps that is the real objective of those preaching divorcement—to hamstring the industry by chopping it up into weak and disorganized little hunks—to divide and conquer. They tell the independent operators that they would be better off if the Government would "disconneck dem bones."

But would they? Suppose we disconnect the producer from the pipe line, disconnect the pipe line from the refinery, disconnect the refinery from the bulk plant, disconnect the bulk plant from the filling station, disconnect them all from the "head bone" of over-all management. The resultant dry bones would rattle around independently until somebody stepped in to perform a connecting service.

In the producing end of the business this connecting service probably would be an independent wholesaler who bought the output of independent producers and stored it in tanks until he could make a sale to an independent refinery and arrange to transport it through an independent pipe line. A common-carrier pipe line would have little interest in building an extension to a new field without assurance that it could handle enough oil to pay out. Both producer and pipe line would be at the mercy of the middleman.

Similarly in other parts of the industry middlemen would spring up to perform a connecting service. Each would exact his toll. Over-all efficiency of petroleum distribution would decrease and consumer prices increase. If there is anything Congress and the public have complained about more than "monopoly" it is "too many middlemen" in various lines of business.

It may be true, though the allegation is more frequently made than proved, that at times the 30 or 40 competing integrated companies have injured some independents. If an individual errs he should be corrected, not disconnected into dry bones. The same with an industry. Integration in the oil industry is responsible for far more progress and service to the public than could have been achieved if it had always been a pile of disconnected dry bones.

XUM

Cent-per-Gallon Processing Tax Sought by Texas Legislator

by Leigh S. McCaslin, Jr.

HOUSTON. — A bill repealing the state's 4-cent-a-gallon retail gasoline tax and substituting a 1-cent-a-gallon processing tax on all combustible fuels, was filed for introduction in the Texas House of Representatives this past week.

This effort to pass the gasoline tax burden from the public to the refiners is the third major tax bill affecting the industry to be presented to the Texas house. Rep. C. S. McClellan is offering a measure to place a production tax of 1 cent per 1,000 cu. ft. on natural gas. A second proposed natural-gas tax is being sponsored by Rep. Deno Tufares of Wichita Falls. Tufares is asking for a tax of 1½ cents per 1,000 cu. ft. of gas at the well head.

Rep. Davis Clifton of McKinney is the author of the bill to repeal the retail gasoline tax. Clifton stated that his measure would bring the state approximately $115,000,000 annually compared with $72,000,000 revenue from the present 4-cents-per-gallon tax paid by vehicle owners.

It was admitted by the bill's author that the refiners would pass any new tax on to the consumers. He said: "The processors would pay 1 cent on every gallon of combustible fuel they produced. Naturally, they will pass that tax on to the consumer, but the motorist will still save 3 cents because he won't be paying a sales tax on gasoline."

The increased revenue to the state would result from the fact that a major portion of Texas gasoline goes out of the state. It is this huge portion—9,445,670,000 gal. out of total production of 11,623,000,000 gal. in 1948—that would produce the greatest revenue. Clifton mentioned that "a large majority of the gasoline produced in Texas is not sold in Texas; therefore no tax revenue is realized by the state on gasoline going out of the state."

Clifton, in amplifying his bill, stated that "this new tax would apply not only to gasoline, but also to such things as naphtha, butane, propane, and all other combustible fuels."

Three Measures Reach House

Three measures affecting the oil and gas industry, which have been previously introduced in the Senate, reached the House this past week. Rep. William Miller of Houston presented the unitization bill which Sen. George Moffett of Chillicothe is sponsoring in the upper house. William S. Fly of Victoria introduced the bill calling for uniform standards for the measurement of natural gas. A measure making it unlawful for the buyer of mineral rights to retain them for longer than 10 years without drilling was introduced by Milton Wilkinson of Patroon.

In announcing his sponsorship in the House of the voluntary unitization bill, Miller told the press that engineers estimate that unit operation of all Texas oil fields would save a possible $15,000,000,000 worth of petroleum products. Under the Moffett-Miller proposal, unit agreements may provide for the following:

1. Establishing pooled units necessary to effect secondary-recovery operation, including cycling, recycling, repressuring, water flooding and pressure maintenance, and for the location and spacing of input and producing wells.

2. Establishing and operating cooperative systems for secondary-recovery operations, or for conservation and utilization of gas, which may include facilities for extracting and separating the hydrocarbons from the wet gas and returning the dry gas to formations underneath the land covered by the agreement.

3. The equitable division, on an agreed basis, of oil and gas produced from the unit.

4. The extension of leases covering any part of the lands committed to the unit so long as operations for drilling or reworking are conducted on the unit or so long as production of oil or gas in paying quantities is had from any part of the lands or leases.

The bill excludes cooperative marketing, crude refining, and refining of natural gas and its byproducts except for the extraction and separation of liquid hydrocarbons.

Association Gives Support

Some public support of the Moffett-Miller bill was given by George Dimock, president of the North Texas Oil and Gas Association. Dimock stated: "Geologists say that secondary-recovery operations and proper utilization of natural gas will increase the ultimate recovery of Texas' oil fields by 50 per cent. The N.T.O.G.A. is especially interested in secondary-recovery operations as more have been started in North Texas than in any other district in the state. Actual experience has convinced us of the necessity of a statute authorizing pooling.

"At the same time we are concerned with fully protecting the interests of landowners, royalty owners and independent operators. . . . Some Texas fields, including the great East Texas field, do not need unitization because they have perfect water drives. To them the pooling bill will have no application, but in many other fields unitization or cooperative operation is absolutely essential to conservation."

Other developments on the Texas legislative front include the referring to committee in the House a resolution by Rep. W. R. Chambers of May to slow down the increasing export of natural gas from Texas to the north and east. Natural-gas producers developed figures which showed the McClelland bill levying a tax of 1 cent per thousand cubic feet would represent a tax of nearly 20 per cent.

Export Controls Get Approval of House

WASHINGTON.—The House of Representatives this week put the finishing touches on legislation extending the Export Control Act until June 30, 1951, the second of President Truman's "must" measures to be acted on.

The bill was passed earlier by the Senate on the basis of a report by the banking and currency committee in which it was pointed out that while the petroleum supply position is satisfactory in this country "a careful check has had to be maintained on the volume of exports because petroleum continues to be in tight world supply."

"The balance in supply and demand was achieved in this country in 1948 by importing more petroleum than we exported," the committee explained. "This is a basic change from prewar. . . . In recognition of the increased dependence of the United States and western Europe upon petroleum supplies from the Middle East and Latin America, petroleum projects abroad have had to be supported with such materials as could be made available. About 80 per cent of the steel allocated for export for all project purposes—petroleum, mining, transportation, food, etc.—is being used for petroleum operations."

First of the Administration's must measures to be enacted provided for continuance until next September 30 of Public Law 395, authorizing industries to make voluntary allocation agreements, which was signed by President Truman February 9.

Legislation providing for a 2-year extension of the Reciprocal Trade Agreements Act and repeal of amendments adopted last year will come before the Senate Finance Committee this week.

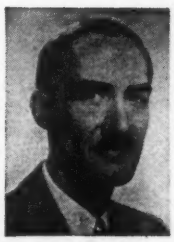
Foreign Output Should Greatly Concern U. S., A.I.M.E. Is Told

by Henry D. Ralph

SAN FRANCISCO. — Countries for which 1948 production figures are available, particularly the Middle East, are increasing their potentials to produce petroleum by such huge amounts as to make the industry in the United States give serious thought to the probable effects of foreign output on the international petroleum trade in future years. the petroleum branch of the American Institute of Mining and Metallurgical Engineers was told by W. H. Farrand of The Texas Co.

Farrand conducted a symposium on foreign production but was unable to give a complete review of the world because several of the scheduled papers were not completed in time for the meeting. Likewise the scheduled review of petroleum activities in the United States was incomplete because storms in the Midwest prevented the arrival of some of the speakers.

L. E. ELKINS
A.I.M.E. chairman



H. G. DOLL
Speaker

W. MOELLER, JR.
Speaker

AUSTIN CADLE
Speaker

Saudi Arabia of Interest

The production review February 14 opened a 3-day schedule of sessions of the petroleum branch. The session on ecomonics was devoted to the oil and natural-gas industries of the Pacific Coast and the Canadian Prairie. Two sessions on technology heard a number of technical engineering papers on reservoir structure and behavior, and description of a new induction logging method for wells using oil-base muds.

Delegates at the production session were most interested in a brief summary of 1948 operations in Saudi Arabia, which revealed 18 wells were drilled at Abqaiq, 2 at Ain Dar, and 4 at Qatif. Production during the year was 142,852,989 bbl. of which 105,902,423 bbl. came from Abqaiq, 33,426,992 bbl. came from Dammam, and 3,523,574 bbl. came from Qatif. At the end of 1948 a total of 99 wells had been drilled in Saudi Arabia, of which 8 are capable of production although 3 are in fields which have no producing facilities.

Additional drilling at Abqaiq indicated that the northern area, formerly called Buqqa, is part of the Abqaiq field which is now about 30 miles long and includes 66,000 acres of proven territory. During the year a successful wildcat was completed at Ain Dar, 30 miles southwest of Abqaiq, and at the end of the year two additional wildcats were being drilled in other areas. During the year geological and geophysical investigations consisted of two surface-mapping parties, two gravity-meter parties, one seismograph party, and three structure-drill parties.

A forum on education of geologists and other petroleum research workers held at the University of California in connection with the A.I.M.E. convention brought out lively discussions on college curriculums, particularly by faculty members of engineering schools. Several suggested that the courses be extended to at least 5 years before granting a degree so that students could take more courses in English, economics, and political science. Several speakers pointed out the necessity for petroleum engineers to have broad knowledge of the entire industry and to be able to make addresses and write papers and also to take part in company and community affairs. Others, however, took the view that scientists who want to become leaders and executives should continue their education after leaving school and that oil companies are not looking for completely rounded men among young technical graduates.

Another argument at this forum concerned more field study of geology. Some urged extending geology courses and requiring much more actual field experience, but others took the view that most of the work of the modern petroleum geologist is done in the laboratory on materials brought to him by technicians in the field.

The educational forum was presided over by E. DeGolyer of Dallas. Formal papers on the place of research in various branches of the petroleum industry were prepared by Gustav Egloff of Universal Oil Products Co., G. C. Gester of Standard Oil Co. of California, Morris Muskat of Gulf Research & Development Co., A. C. Rubel of Union Oil Co., W. H. Geis, consulting engineer of Los Angeles, and C. A. Heiland, of Heiland Research Corp., Denver.

Induction Logging Described

A new logging method, called induction logging, which measures the conductivity, or resistivity, of the strata traversed by a bore hole, was described to the A.I.M.E. audience. The apparatus comprises a coil system coupled with the ground by induction, so that there is no need for direct contact with the mud, or with the formations. For that reason, the method is particularly useful in oil-base mud, and it was first applied to that case. The paper was "Introduction to Induction Logging and Application to Logging of Wells Drilled with Oil Base Mud," and the author was H. G. Doll, director of research, Schlumberger Well Surveying Corp., Houston. (The highlights of this paper will be published in the Journal next week.)

Summaries of papers presented at the A.I.M.E. petroleum economics sessions are given below:

"Supply and Demand Problem of the California Natural-Gas Industry," by William Moeller, Jr., Southern California Gas Co., included a short history of the industry in California, its problems, and the steps that are being taken to solve these problems. Gas is supplied the California area by locally produced gas and by gas transported from outside the state through a recently completed pipe line. Seasonal variations in demand have been partially met by using partially depleted gas or oil reservoirs for storage during summer months, but growth of population and industry requires still more storage space.

Results and significance of oil discovery in Leduc, Redwater, and other fields and their influence upon Canadian economy were given by H. H. Hewetson, president, Imperial Oil Co., Ltd., in his paper "Developments in the Petroleum Field in Canada and Their Impact on the Economy of Canada." For 1949 he predicted an expenditure of $50,000,000 for exploration and an even greater amount to be spent for pipe-line, refining, and other facilities. This spending will

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Wherry Report Fails to Properly Evaluate Oil-Industry "Stocks"

by Charles J. Deegan

The report of the so-called Wherry committee, summarized in the Journal of February 3, alleged that the scarcity of fuel oil last winter was due to a conspiracy to withhold supplies. Chief conspirators were said to be the regulatory agencies of the oil-producing states.

The following article is an analysis and refutation of part of the Wherry report by one of the Journal's editors.

BECAUSE someone in the United States Senate failed to grasp the true meaning of the word "stocks"; because someone did not understand something so simple that every housewife and every corner grocer knows all about it; because of a little thing like that, this is what happens:

At least two United States senators, Kerr of Oklahoma, and Schoeppel of Kansas, a federal agency, the Bureau of Mines, plus the governors and other state administrative officials in twenty-odd oil-producing states who have held office during the past 10 to 15 years, all have been publicly accused of being part of a gigantic scheme that fostered monopoly in the petroleum industry. As a result they are accused of being partly responsible for the oil shortage of the winter of 1947-48. Of course the major oil companies are accused of being the major villains, although the accusations against the Bureau of Mines are scarcely less vehement.

It is a chain of events amazingly like the old rhyme—"For the want of a nail, the shoe was lost; for the want of a shoe, the horse was lost; for the want of a horse, the soldier was lost; for the want of a soldier, the battle was lost. . . ."

Because someone connected with the U. S. Senate oil subcommittee of the special committee to study problems of American small business, failed to grasp the fact that you can't operate a business without working stocks, all of the people mentioned above stand publicly accused in an official document of the United States Senate.

To supply the petroleum demands of the people of the United States, the oil industry has to have around 220 to 250 million barrels of crude oil in its working stock. For instance, there are thousands of miles of crude oil pipe lines. These lines are full of crude oil at all times. You can't take oil out at the delivery end until first you have pumped the line full. After that the line stays full of oil as long as it is in service. The oil in there today isn't the same oil that was there yesterday, but there are just as many barrels. Then there is the oil that is in tankers, traveling from the oil fields of the Gulf Coast to the refineries of the East Coast.

During the time the Senate committee talks about approximately five tankers of crude oil from the Gulf Coast were unloaded every day on the East Coast. The average tanker took about 10 days to travel from the Gulf to the east. So there was at all times a minimum of about 50 tankers at sea loaded with crude oil. This too was part of the "stocks" the Senate Committee based its charges on.

These are only two items of many in the total that make up the working stocks of the oil business. Any business man, any corner grocer knows that he has to carry a certain inventory to be able to handle his business. Every manufacturer knows this problem. The oil business has all of these, and fundamentally they are exactly the same. There is a minimum inventory level of working stocks that must be on hand to carry on any given amount of business in an efficient way.

But ignoring this simple fact, the Senate subcommittee makes this statement:

"At the time the consumers were feeling the greatest pinch in January and February 1947, there were 220 million barrels of crude oil in storage, mainly controlled by the larger units, which could have been distributed among independent refiners who were running under capacity. But the controlled economy existing in the oil industry needs an absolute balance of supply and demand, because it does not contemplate drawing on stocks. When the Bureau of Mines, through its monthly forecasts of demands, underestimated the demand by close to 2 per cent for each of the years 1946 and 1947, the spot shortages followed as night the day. The mechanism was wound too tight."

Most sales managers and most economists would have thought that any agency that could hit within 2 per cent of the demand for their product

(Continued on page 174)

Wherry Urges Study of Supply and Resources of All Basic Materials

WASHINGTON.—A thorough study of the supply and resources of all basic materials, including steel, aluminum, and copper; an investigation of existing capacities in all plants engaged in the production of steel, and the compilation of full information on domestic requirements for steel and other basic materials were recommended last week by the Senate small business committee in a series of final reports winding up its work.

The committee, through Sen. Kenneth S. Wherry of Nebraska, chairman, also urged that Congress continue to maintain surveillance over exports of strategic steel products to all parts of the world, and in particular that the Department of Commerce be asked to submit a complete record of all shipments of steel products for the development of Middle East oil projects last year and for the future—"with a justification for each project."

Wherry also suggested that export controls be extended to all exports to Canada, "for the obvious 'good business' reasons of knowing, in advance, what and how much is being shipped, and to what use it will be put."

Wherry reviewed the testimony given at the hearings held by the committee on various phases of the steel situation, declaring that the shortage of steel for oil wells in the western states is due "to lack of historical-purchase position with mills, increased use of steel, distance from supply centers, and dependence upon local warehouses, which are not getting sufficient steel.

"Major oil companies," he said, "have the advantage of direct-mill supply, and further can shift supplies between centers of operation to take care of needs."

Wherry's call for control of exports to Canada was based in part on the disclosures a year ago that while distribution of fuel was difficult on the East Coast, exports to Canada had increased 20 per cent over the previous year. As a result of the committee's efforts, he said, the Secretary of Commerce placed an embargo on oil exports until Canada agreed to cut

(Continued on page 177)

_____this week

INTERNATIONAL—Construction on 1,067-mile Trans-Arabian Pipe Line Co. project to be brought to standstill soon. . . . Resumption of work impossible before early summer even with early favorable action by the government on company's application for further pipe exports. . . . ¶Plans announced for construction of a new 10,000-bbl. daily capacity refinery in Italy's Po Valley by California Texas Oil Co., Ltd. . . . ¶Creole says outlook for oil industry healthy despite changing supply-demand picture. . . . ¶Chilean Government gets new producer in Manantiales field rated at 300 bbl. daily. . . . ¶Construction work to get under way soon on 25,000-bbl. topping plant in Kuwait. . . .

EXPORTS—House approves extension of Export Control Act until June 30, 1951. . . . ¶Wherry committee urges Congress to keep close watch on exports of strategic steel products to all parts of the world—particularly steel products used for Middle East oil development. . . . ¶OIT lifts some quantity restrictions on exports of crude petroleum and products. . . . Quotas for other petroleum products greatly increased. . . .

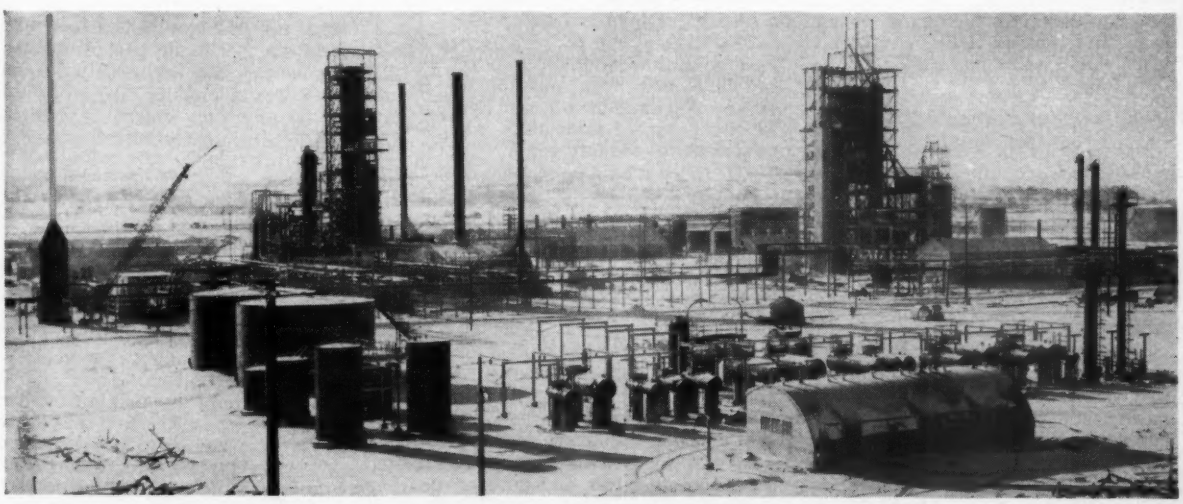
IMPORTS—Eugene Holman, Jersey Standard president, in letter to Beauford Jester, Texas governor, reports that imports of crude are not alone responsible for industry's troubles. . . . Assures Jester that a desire for a healthy domestic producing industry motivates company's actions.

GOVERNMENT—Administration seeks $1,150,000,000 for ERP to carry through April quarter this year. . . . Seeks $4,430,000,000 appropriation and contract authorization for fiscal year beginning July 1. . . . Petroleum requirements for ECA not yet determined. . . . ¶Bill is introduced in Texas House calling for repeal of state's 4-cent-a-gallon retail gasoline tax. . . . Would substitute 1-cent-a-gallon processing tax on all combustible fuels. . . .

TRENDS—Crude-oil production in U. S. averaged 5,336,650 bbl. daily for week ended February 14, a decrease of 26,475 bbl. from previous week and 20,000 bbl. less than same week last year. . . . ¶Daily average crude runs to stills dropped 101,000 bbl. for week ended February 5 to 5,389,000 bbl. or just 41,000 bbl. daily above the same week in 1948. . . . Total crude runs in the last 3 weeks have been 6,500,000 bbl. less than in the previous 3-week period. . . . ¶Stocks of four major products decreased 3,771,000 bbl. for week of February 5, the first normal winter-time decrease of the season, but total still remains about 80,000,000 bbl. above last year. . . .

REFINING—Sun Oil introduces new dual-purpose oil for use in hydraulically operated machine tools. . . . ¶New chemical company organized in Augusta, Ga. . . . ¶Dow Chemical to expand Canadian facilities. . . . Will spend $5,000,000. . . . ¶Lube-oil production down compared to 1948, W.P.R.A. reports. . . . ¶Germans obtain artificial resins from acetaldehyde. . . .

PIPE LINES—Texas Empire Pipe Line Co. completes arrangements for use of 18-in. pipe throughout 197-mile Patoka-Wilmington, Ill., crude-oil line. . . . ¶Transcontinental Gas Pipe Line Corp. establishes Houston headquarters as first shipment of pipe leaves Los Angeles. . . . ¶South Jersey Gas ready to spend $2,000,000 on pipe lines upon FPC approval. . . . ¶Eastern Tennessee Natural may get 25,500 tons of 22-in. pipe for proposed new lines.

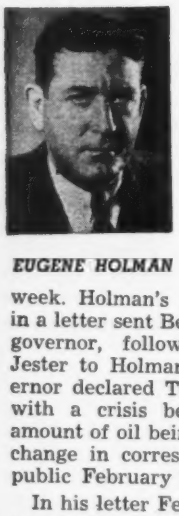


Shown here about two-thirds completed is the Carter Oil Co.'s new Oval-E refinery at Billings, Mont. Recent heavy snows, storms, and continued subfreezing temperatures throughout widespread areas in the oil country have greatly hindered full-scale operations and industry activity

XUM

Actual Imports Not the Threat They Seem, Holman Tells Jester

RECENT cutbacks in United States crude production are the result of a combination of circumstances—tanks becoming full, foreign production approaching foreign demand, a record warm winter in the East—and it is hardly accurate to attribute them to net imports of oil, Eugene Holman, president of Standard Oil Co. (N. J.) said last week. Holman's remarks were made in a letter sent Beauford Jester, Texas governor, following a letter from Jester to Holman in which the governor declared Texas was confronted with a crisis because of the large amount of oil being imported. The exchange in correspondence was made public February 10.



EUGENE HOLMAN

In his letter February 1, Jester said importation of oil had forced the Railroad Commission to curtail production, that the income of the state as well as independent producers and royalty owners was seriously affected, and that the incentive for the development and discovery of new domestic reserves had been hampered. He said he also was writing officials of other American companies importing oil into the United States.

In reply, Holman said, as a member of the National Petroleum Council's national oil-policy committee, he strongly endorsed the stand on imports and agreed that a vigorous, healthy domestic industry is most important.

Figures Deceiving

Holman told the governor that the impression that foreign oil has replaced domestic oil for domestic consumption and that this country is dependent upon foreign oil is not justified.

"Government statistics show that net imports for 1948 were 144,000 bbl. daily," Holman said. "These statistics might appear to substantiate this impression. Such, however, is not the case. Domestic oil production exceeded domestic consumption in 1948 by more than 400,000 bbl. daily."

A large part of this margin above domestic consumption went to rebuilding stocks at the rate of 284,000 bbl. daily, Holman explained. Also, he said, the reported total imports of 509,000 bbl. daily included about 70,000 bbl. daily of fuel oil brought into our ports in bond to bunker ships in foreign trade and therefore is not oil entering domestic trade or consumed in this country.

On the other hand, the reported total exports of 365,000 bbl. daily did not include bunkers supplied to foreign ships and consumed abroad, nor military purchases in the United States which were shipped abroad, some for foreign civilian use, he said.

"It may be seen, therefore, that the statistical reports did not necessarily show the physical situation as to movement of oil into and out of this country," Holman wrote.

"In 1948, domestic producers were called upon to supply not only domestic consumption but replenish stocks, and provide for oil consumed outside of this country, a large part of which could have been supplied from foreign sources had adequate foreign supplies been available."

Brown Issues Rebuttal

Holman's reasoning was attacked immediately by Russell B. Brown, general counsel of the Independent Petroleum Association of America, who declared it "unrealistic" to argue that imports have not displaced domestic oil "when these imports are actually increasing rapidly and Texas and other states are actually being forced to cut back production in order to avoid oversupply and waste."

Standard itself has reduced its takings of domestic oil and increased its imports materially within the past 3 months, Brown charged.

The strategy for a campaign to secure a limitation upon imports will be developed at a meeting in the IPAA Washington offices February 20 of a group of association members named as a committee.

"No Cause for Alarm"

Adjustments of production to meet changing conditions are characteristic of the industry and there is no cause for alarm, Holman declared. Domestic consumption is expected to increase steadily at a normal rate, and the outlet for domestic crude to meet domestic consumption in 1949 will be about the same as the average production last year.

"Domestic producers will be kept busy finding and developing enough oil to maintain this high level of production and to have a bit to spare for emergencies," he predicted.

Holman explained that Jersey Standard made contracts for Middle East crude during the period of tight supply last year which will not expire until the middle of 1949, but arrangements to reduce loadings of its own supplies of Middle East oil for import into this country were made early in December and will be reflected in receipts this month and next.

Loadings of both Jersey's own and purchased Middle East crude averaged 88,000 bbl. daily in the fourth quarter of last year, but now are scheduled at 50,000 bbl. daily in the first quarter of 1940 and tentatively at about 33,000 bbl. daily in the second quarter.

"Future imports of crude will depend upon our over-all product requirements, and upon operating capacity of existing and new foreign refineries, etc.," Holman said.

"Naturally, if we are unable to obtain sufficient domestic crude to meet the domestic product outlet of our refineries, it would be necessary to supplement domestic crude with imported crude to assure adequate product supplies for our domestic customers.

"You may rest assured that any decisions and actions on our part will start from the premise that a healthy domestic producing industry must be maintained. This is the premise of the National Oil Policy of the National Petroleum Council with which we are in accord."

Jester, in his original letter to Holman, made plain his conviction that imports are responsible for the curtailment of domestic production. He pointed out that, as a former member of the Railroad Commission, chairman of the Interstate Oil Compact Commission, and as governor, he had not opposed the supply of steel for foreign oil development on the understanding that imports from foreign fields would be used only to supplement domestic supply and not jeopardize the domestic industry.

"The oil industry is an essential part of the economic life of Texas," the governor said. "The entire economy of Texas and its citizens is injured by anything which injuries the domestic oil industry in this state."

Unit Agreement Sought For California Pool

WASHINGTON.—The House armed services committee last week voted to approve a unit agreement for the 27-B pool of the Buena Vista Hills field in Naval Petroleum Reserve No. 2, California.

The agreement was submitted for approval by the Director of Naval Reserves. It provides that repressuring of the pool is to be undertaken by Standard Oil Co. of California and other lessees, with the expectation that the recoverable oil in the reserve will be increased from 100,000,000 to 120,000,000 bbl.

Some Export Restrictions Lifted, Other Quotas Greatly Increased

by Bertram F. Linz

WASHINGTON. — Quantity restrictions on exports of crude petroleum, residual fuel oil, blending agents, refined paraffin wax with a melting point above 130° F. (A.m.p.) and petroleum coke were lifted by the Office of International Trade last week, and quotas for other petroleum products were greatly increased.

The "open-ending" of residual was made effective immediately, together with increases in first-quarter quotas for aviation and other motor fuel, kerosine, and distillates. Crude, wax, and coke will be open-ended for the second quarter.

Open-end quotas are a device resorted to by the OIT to permit practically unrestricted exports of commodities no longer in short supply, but where the domestic supply situation has not improved sufficiently to permit complete decontrol. In this way licenses can be approved without quota restriction, on applications giving the Government advance notice of intended shipments.

Open-Ending Considered

OIT has given consideration to the open-ending of the other petroleum products, but retained quotas following objections by the military that the situation did not warrant such action, particularly with respect to kerosine. At the same time, however, the armed services are modifying their requirements in the light of current conditions, and it is probable that the third quarter will bring about the opening of export trade without restrictions on any products other than possibly aviation fuel.

In announcing its action, OIT increased first-quarter quotas for aviation fuel by 530,000 bbl., automotive fuel by 990,000 bbl., kerosine by 750,000 bbl., and gas oil and distillate fuel oil by 2,000,000 bbl. The original quotas called for 1,570,000 bbl. of aviation fuel, 4,710,000 bbl. other motor fuel, 450,000 bbl. kerosine, and 4,000,000 bbl. gas oil and distillates.

Two of the increases in quotas were subject to restrictions, OIT announcing that applications for shipments of aviation fuel from West Coast ports will be "severely screened" and that the additional motor fuel allowed will be licensed only for shipment from East Coast and Gulf Coast ports.

For the second quarter, the only products for which quotas were set are automotive fuel, for which 6,000,000 bbl. was allowed; aviation fuel, 2,000,000 bbl.; kerosine, 800,000 bbl., and gas oil and distillate fuel, 7,000,000 bbl.

Quotas Listed

Country quotas, however, were set for only aviation fuel and kerosine, the quantities allowed for motor fuel and gas oil and distillate being sufficiently large to cover all anticipated requirements. Specific assignments for individual countries were as follows:

ECA countries: Denmark, 8,000 bbl. kerosine; France, 190,000 bbl. aviation fuel; Greece, 50,000 bbl. aviation fuel; Ireland, 30,000 bbl. aviation fuel, 10,000 bbl. kerosine; Italy, 75,000 bbl. aviation fuel; Netherlands, 16,000 bbl. kerosine; Norway, 20,000 bbl. kerosine; Portugal, 20,000 bbl. aviation fuel, 20,000 bbl. kerosine; Sweden, 75,000 bbl. kerosine; Switzerland, 5,000 bbl. kerosine; Turkey, 90,000 bbl. aviation fuel, 40,000 bbl. kerosine; United Kingdom, 420,000 bbl. aviation fuel, 175,000 bbl. kerosine.

ECA territories: British West Africa, 18,000 bbl. aviation fuel, 20,000 bbl. kerosine; French North Africa, 50,000 bbl. aviation fuel; French West Africa, 15,000 bbl. aviation fuel, 20,000 bbl. kerosine; French Oceania, 5,000 bbl. kerosine.

Latin America: Brazil, 50,000 bbl. aviation fuel, 40,000 bbl. kerosine; Costa Rice, 4,000 bbl. kerosine; Cuba, 35,000 bbl. aviation fuel, 5,000 bbl. kerosine; Guatemala, 5,000 bbl. aviation fuel, 5,000 bbl. kerosine; Mexico, 12,000 bbl. aviation gasoline, 20,000 bbl. kerosine; Salvador, 3,000 bbl. kerosine.

British Commonwealth: Australia, 8,000 bbl. aviation fuel, 20,000 bbl. kerosine; Newfoundland, 130,000 bbl. aviation fuel; New Zealand, 20,000 bbl. aviation fuel, 8,000 bbl. kerosine; Union of South Africa, 10,000 bbl. kerosine.

Far East: Japan, 25,000 bbl. kerosine; Philippines, 20,000 bbl. aviation fuel, 30,000 bbl. kerosine.

OIT set aside 72,000 bbl. of aviation fuel and 6,000 bbl. of kerosine for projects, and placed 690,000 bbl. of aviation fuel and 210,000 bbl. of kerosine in reserve.

Second-quarter quotas of casing and line pipe also were increased over the current period, the allotment of seamless being jumped from 70,000 to 80,000 tons and for welded from 37,000 to 42,500 tons. The quota for commercial exports of seamless was reduced from 5,000 to 3,000 tons and that for welded from 2,500 to 2,000 tons, however.

Index Ready Now

The complete editorial index of The Oil and Gas Journal for 1948 is now ready and will be sent without charge to all subscribers requesting a copy. This 48-page index is bound separately and is completely crossindexed. Address requests to Circulation Department, Box 1260, Tulsa.

Superior's California Well Sets New Depth Record

Superior Oil Co. on February 14 broke its own world's record for the deepest well ever drilled when its 1 Limoneira in Ventura County, California, reached 17,926 ft., passing the previous record of 17,823 ft. established in 1947 by this company's 51-11 Weller in Caddo County, Oklahoma. No indication has been given as to how much deeper the well will be taken. About 70 ft. a day is being made at the present time.

The new record holder is located 6 miles east of Ventura in Section 9-2n-22w. It is also 5 miles northeast of Standard of California's 1 Maxwell, an unsuccessful wildcat which until last week held the California depth record at 17,696 ft. Spudded on September 6, 1948, the Superior well was drilled to 17,824 ft. in the fast time of 5 months and 6 days by the company's own crews. Not a single delay due to mechanical difficulties has marked its progress to date. The hole is open below 11,204 ft.

A month ago Superior Oil Co. broke the Rocky Mountain district depth record when its Pacific Creek wildcat in Sublette County, Wyoming, passed the record previously held by Pure Oil Co.'s 1 Unit in Natrona County at 14,307 ft. The latter well, however, continues to be the world's deepest producer.

Building Completion Near

A building company headed by Vincent & Welch, independent oil producers, and Charles Noble, drilling contractor, has predicted completion of its ultra-modern 10-story office building, located in Lake Charles, La., for about March 15. Most of the occupants of the building will be oil companies and suppliers. The building is being erected by Pioneer Building Corp.

International

WORLD-WIDE OIL DEVELOPMENTS

Tapline Progress Bogging Down; Pipe Supply Fails to Keep Pace

CONSTRUCTION work on the 1,067-mile Trans-Arabian Pipe Line Co. project will be brought to a standstill in the next few weeks, and even with early favorable action by the government on the company's application for further pipe exports, full-scale resumption of the work would not be possible before early summer.

Pipe laying has been proceeding at a reduced rate as a result of the continued failure of the Office of International Trade of the Department of Commerce to grant Trans-Arabian's export permit. About 220 miles of the 238 miles of pipe shipped prior to last July 1 have been laid, and the remaining pipe is expected to be exhausted early in March.

Indications are that the domestic steel supply is improving and the better political outlook in the Middle East could bring authorization of the Trans-Arabian pipe exports when second-quarter allocations are announced. However, with no pipe on the ground, several months would be required to reassemble shipping and make deliveries at Ras Misha'ab, the Persian Gulf unloading point.

Syrian Approval Pending

Another obstacle has been the lack of final parliamentary approval by Syria of the right-of-way agreement negotiated by the company with that government, but recent reports from Damascus indicate this will be given soon.

Under procedure of the Syrian Parliament, the agreement must be submitted in the near future to be acted on at this session. Lebanon already has approved the right-of-way, and has reached an agreement with Syria on matters of common interest. Last June, the Syrian Government decided against submitting the right-of-way agreement in view of feeling against the United States for alleged support of Palestine's Jewish state.

Terminal of the 30-31-in. line is to be at Sidon, about 30 miles south of Beirut, in Lebanon, but because of the poltical situation, the company changed its original plans to lay from both ends and has done all work thus far in Saudi Arabia.

Total amount invested thus far in the line amounts to about $80,000,000 out of a total estimated cost of $200,000,000. The delays encountered on the project and the maintenance of idle crews and technicians have been costly to the company.

As a result of the status of the line, the proposed 50,000-60,000-bbl. refinery which was to have been built near the terminal by Mediterranean Refining Co. is reported deferred indefinitely. Mediterranean Refining was a joint undertaking of the Caltex Oil Co., Ltd., and the Socony-Vacuum Oil Co., Inc., but it is reported that Socony-Vacuum has withdrawn from the project. Socony-Vacuum has a 10 per cent interest in the Arabian operations against 60 per cent for Caltex's owners, Standard Oil Co. of California and The Texas Co.

Russia Reports 1948 Oil Production Up Over 1947

The Soviet Government has announced its 1948 petroleum production represented a 13 per cent increase over 1947 and has given further evidence of improved supply by trade agreements providing Russian oil for Bulgaria and Poland.

Russian policy calls for announcing all industrial production only in ambiguous percentage terms, but the 1948 increase is believed to have brought Soviet production, including Sakhalin, to a daily average of about 612,000 bbl. daily for the year.

The agreements with Poland and Bulgaria includes petroleum as one of a number of commodities to be furnished by Russia in stepped-up trade with the two Communist-dominated countries.

Russia also has announced that five petroleum and gas-fuel agencies have been merged to form the Ministry of the Oil Industry of the U.S.S.R. Nikolai Baibakov has been made head of the new Russian oil ministry.

Caltex Plans 10,000-Bbl. Refinery in North Italy

PLANS for the construction of a new 10,000-bbl. daily capacity refinery in the Po Valley of northern Italy have been announced by California Texas Oil Co., Ltd.

The project will be undertaken in conjunction with the Fiat company of Turin. Caltex announced it had concluded agreements with Fiat to buy an interest in Petrolea, S.A., a company owned by Fiat and engaged in marketing petroleum products in Italy. New name of the marketing company will be Petrolcaltex.

New Operating Company Formed

The operating company for the new refinery already has been organized. It will be known as SARPOM (Societa per Azioni Raffineria Padana Olii Minerali). The refinery will process Arabian crude oil which will be supplied through a pipe line connected to a coastal terminal at Savona in the vicinity of Genoa. Caltex said the refined products will be marketed primarily throughout the industrial centers of northern Italy.

The new refinery will be a substantial addition to the Italian refining industry which now has a total throughput of about 54,000 bbl. daily in seven plants. For Caltex, it is a part of an over-all European expansion program which also includes new refineries in France and The Netherlands and a 25 per cent interest in a Spanish refinery.

The Caltex announcement, which confirmed long current reports, did not specify location of the new refinery. Reports from Italy, however, said the pipe line will extend to Trecate, about 90 miles from the terminal.

XUM

Creole Sees Healthy Outlook for Oil Industry Despite Cutbacks

ALTHOUGH the petroleum industry's changing supply - demand picture is causing reductions in crude output in most of the major oil-producing areas of the world, demand is still rising slowly and with price adjustments that have been made, the outlook is for a healthy situation in oil with respect to both producer and consumer.

Creole Petroleum Corp. made this statement February 10 in commenting on recent supply-demand trends and the influences on its own operations. The company reviewed briefly the basic causes of recent cutbacks in production and reductions in price and concluded with an optimistic prediction for the industry as a whole.

In the face of unexpectedly sharp demand increases after the war, Creole said it exerted every effort to expand output to maximum efficient limits. Production rose from about 500,000 bbl. daily at the beginning of 1946 to 652,000 bbl. daily in September 1948. Similar efforts were made by other oil units, and as a result, it has been possible not only to meet demand but to make important additions to stocks.

Other Factors Involved

"In addition to the more favorable supply position, consumption during the present winter showed a smaller percentage increase than the percentage increase of the three previous winters, owing to a number of unpredictable factors," Creole said. "These included a flattening out of the rate of industrial activity, an extensive shipping strike which cut the demands of shipping for bunker fuel, and an unusually mild winter in the northeastern section of the United States where the use of industrial heating oils is particularly concentrated."

The company said its storage was virtually at capacity and the output of some of its wells producing heavy oil had been reduced. The reduction is at present about 100,000 bbl. daily —15 per cent below the postwar peak —but still above the level at the end of the war. Creole also pointed out the market price of heavy fuel oil to consumers since November has dropped some 90 cents a barrel and that the company has made reductions ranging from 10 to 35 cents per barrel in prices of its crude oil of these grades.

Another indication of the trend toward less rapidly increasing production world-wide was the disclosure that Arabian American Oil Co. has scaled down some of its production goals. These originally called for a rise from the present production, 446,000 bbl. daily in December, to more than 600,000 bbl. daily. This company is reported expecting to hold output in 1949 to between 500 and 525,000 bbl. daily on account of demand factors.

Chile Gets New Producer In Manantiales Field

THE Chilean Government's Corporacion de Fomento de la Produccion has completed Well 18 as an oil producer in Cerro Manantiales field, begun Wells 19 and 20, and is expected to commence construction late this month on a 42½-mile pipe line which will allow Chile to begin its first commercial oil production in the Tierra del Fuego area.

Well 18 was slightly higher on the structure and showed a somewhat higher gas-oil ratio of about 1,500-1. It is rated at about 300 bbl. daily, approximately the same as the other wells in the field.

Latest reports were that Well 19 was being spudded and Well 20 had been located and would be started in the near future. Testing was in progress in the well on the San Sebastian structure about 50 miles south of Cerro Manantiales.

The Chilean agency has shipped some construction equipment, including bulldozers, side-boom tractors and welding machines, as well as some of the pipe for the 8-in. line. Engineering has been completed by Williams Brothers Co. and the question of a contract for construction is described as still "open." The line is to be financed entirely by the Chilean government. The project also includes field gathering system, tankage, a pump station, and two 3,300-ft. 16 and 12-in. submarine lines.

Stanolind Suspends Colombian Exploration

Stanolind Oil & Gas Co. last week suspended all exploration activities in Colombia and crews are being returned to the United States. Stanolind officials reported that exploration activities are being suspended pending a "more favorable industry situation." Stanolind still retains its concession rights in the country.

International

Kuwait Oil Co. Plans New Topping Plant

CONSTRUCTION work is scheduled to get under way in the near future on a 25,000-bbl. topping plant in Kuwait for Kuwait Oil Co., Ltd.

The plant is designed to serve only local needs, principally ships' bunkering. Representatives of the contractor, E. B. Badger & Sons Co., Boston, are now on the ground making preliminary arrangements. Completion of the plant is due early in the third quarter of this year.

The plant is a part of the continuing expansion program of the Kuwait company. Work is well advanced on a marine terminal and pier which will handle six tankers and two dry-cargo vessels simultaneously. This is to be completed about the middle of this year.

Kuwait's Buran field is now considered the largest single oil reservoir in the world, and the company has hopes of opening a new oil reserve in a deep lime section between 8,000 and 8,500 ft. A well is to be started later this year to test this section. Present production is from sands averaging about 4,700 ft. in depth.

New Production Found In French Morocco

Additional production has been found in French Morocco about 6 miles southwest of Oued Beth field, according to reports from Paris.

Societe Cherifienne des Petroles, the joint French and Moroccan government company which is developing the area, found oil in the new well at about 2,000 ft. Initial production was not reported, and it was considered too early to evaluate the discovery fully.

Oued Beth, discovered in 1947, produces about 300 bbl. daily from three wells and is the largest of any of the several scattered fields in Algeria and Morocco.

Company Regains Property

Eight installations seized by the Japanese Government in 1941 will be restored to Standard-Vacuum Oil Co. on February 10, according to a directive of the Allied commander in Japan. The property includes the company's Yokohama office and land as well as land and petroleum distribution facilities at eight places in Japan.

Salt Domes Are Source for Almost Entire German Oil Production

by Lester S. Thompson

OF approximately 84,000,000 bbl. of crude petroleum produced in Germany to date, some 78,750,000 bbl., or 94 per cent of the total, have been derived from the salt domes. In all, 24 fields have been exploited on this type of structure. Of these, 13 may be classed as minor fields with an aggregate of only 7 per cent of the total cumulative salt-dome production. With the exception of Wesendorf and a possible extension of Heide, all of these fields can be considered completely drilled. Their records of production are given in Table 1 and their futures have been closely estimated. Calculating on the basis of known reserves and observed rates of decline, it is estimated that by 1966 production from these fields will have fallen to 343,000 bbl. per year which is only about 10 per cent of the rate for the current year—3,322,000 bbl. The existing salt-dome fields are, therefore, of academic interest only and do not warrant detailed description here.

Fields on Simple Anticlines

1. **Hannover basin.**—With the exception of the small field of Fallstein (brought in during 1935 and abandoned in 1937 with a total yield of 13,000 bbl.), the only oil field in the Hannover area developed on a simple anticline is that of Steimbke. For the first 3 years following its discovery in 1936, production was insignificant, but, during the war years, it was subjected to intensive exploitation. In the 3 years, 1946-48, production was maintained at a figure very little below the wartime level (860 bbl. per day as against 945 bbl. per day). The field may be considered completely developed. The reserves are calculated at 2,000,000 bbl. From observed rates of decline, it is estimated that, by 1966, production will have fallen from the present rate of 890 to 80 bbl. per day. In other words, as far as future is concerned, this field can be put in the same category as the salt-dome fields.

2. **Emsland.**—The most interesting and most valuable discoveries of recent years center in the area between the Ems River and the Netherlands boundary. The typical structure of this area has already been described. Four oil fields and one major gas field have been discovered in this region. The producing horizon of three of the oil fields is the Bantheim sandstone (Valendis—Lower Cretaceous). The lithology varies from field to field. In Georgsdorf and Emlichheim there are very porous sands with a high degree of permeability. In fact, in the latter field, the tendency is toward loose, running sand. In nearby Adorf, however, the Valendis is an impervious rock and production is from the underlying Wealden. In Bentheim gas field to the south, neither the Valendis nor the Wealden is a producer. The gas is derived from the Platten dolomite of the upper Permian Zechstein some 2,000 ft. deeper.

Development work to date has not been sufficient to determine the limits of these fields either laterally or longitudinally, and it is believed that the estimates of reserves given are conservative. In any event, it would appear that this area is capable of sustained production for at least 15 years at a rate exceeding that at present.

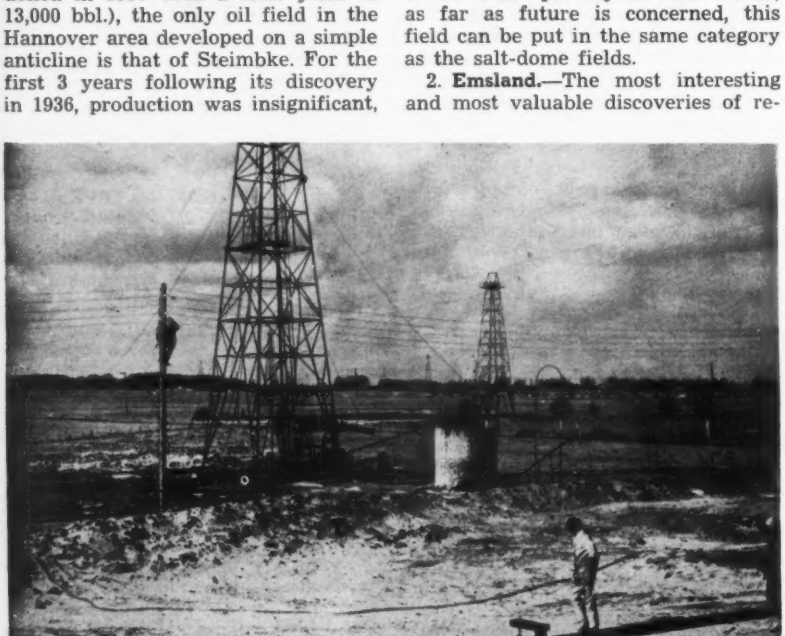
International

This is the second and concluding article by the author, who recently completed an 8-month study of the German oil industry and its future possibilities for the U. S. Military Government in Germany. In the previous article Thompson presented a background of oil development and problems peculiar to the country. A brief outline of the general geology of Germany was given.

German Drilling

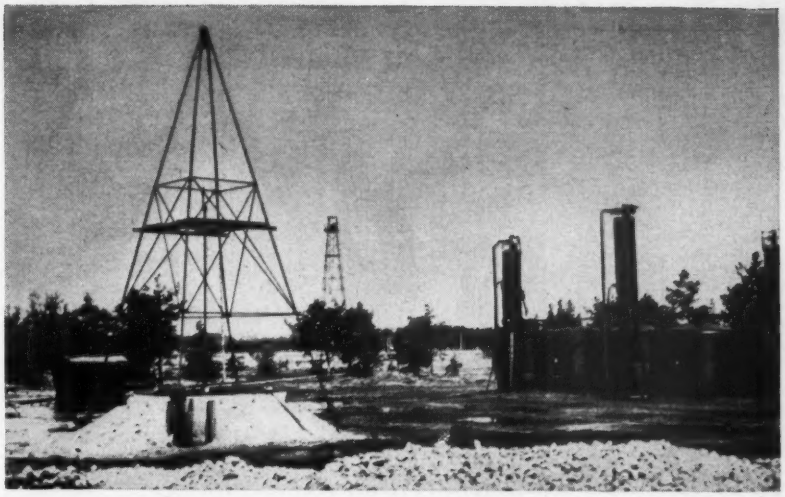
1. **Exploration wells.**—Prior to 1933, an average of about 20 exploration wells were drilled per year. During the 13 years from 1934 to 1946, inclusive, an intensive prospecting campaign was effected. More than 1,000 wildcats were drilled with an aggregate footage of 2,600,000 ft. Of this total, practically 70 per cent were drilled by government subsidy. In spite of the fact that the locations were made on the best geological and geophysical data available, only 23 wells were successful. The record for 1947 indicates no improvement. Twenty-eight exploratory wells were drilled with a total footage of 140,000 ft. Of these, 27 were dry holes. The one exception (Eilte) was little more than a "show," total production to July 1948 being only 140 bbl. The program for 1948 called for 46 additional wildcats with an estimated footage of 145,000 ft. Returns from this drilling have not yet been received.

2. **Production wells.**—These wells,



Pumping well in Emlichheim field. Of Germany's total 1,636 wells 1,518 are on pump

drilled within proved areas or along lines of probable extension, enjoy much better chances of success than the wildcats. During the 13-year period under discussion, some 1,400 wells of this category were drilled aggregating 5,000,000 ft. Records of this work are incomplete. Taking the year 1947 as a fair sample, we find that of a total of 86 wells drilled, 63 became producers and 23 were dry holes. In the early days of the industry, wells were spaced at very close intervals. The practice currently followed is to space them at 200-m. intervals at the corners of equilateral triangles so that the average area is 8.5 acres per well.



A part of the facilities in Georgsdorf field

Production Practice and Costs

At the present time, Germany is producing at the rate of 14,000 bbl. per day from 1,636 wells. Of these, 118 are on natural flow and 1,518 are pumped. The gravity of the oil varies for different fields from 19° to 36° A.P.I. with occasionally a low of 13° and a rare high of 40°. On the basis of observed rates of decline, it is estimated that the output of the present producing wells will have declined 50 per cent in the next 5 years. Additional drilling is required if the optimum is to be realized.

Costs are difficult to estimate especially during the period of government subsidy. The problem is further complicated by the question of foreign exchange. German costs are quoted in marks, but until recently, there is no doubt as to the worth of a mark. Based on the current quoted rate of 3 marks to the dollar, completions are costing from $13 to $20 per foot in the relatively shallow fields of Emsland (1,600 to 3,000 ft.). It is possible that with improved equipment and technique and a freer flow of materials these costs can be reduced. For the present, however, $15 per foot seems a fair average. Going back to the development since 1933, we have:

The overhead charges are more difficult to calculate. The German engineers estimate the over-all total including overhead to be from 100 to 120 marks per metric ton, or from $4.50 to $5.75 per barrel.

	Barrels
Total production	31,000,000
Estimated reserves (in sight and probable)	87,000,000
	118,000,000

Drilling—	Footage drilled (ft.)	Cost	Cost per bbl.
Wildcats	2,900,000	$43,500,000	$0.37
Production to date	5,000,000	75,000,000	0.635
Production future	2,000,000	30,000,000	0.255
			$1.26
Lifting cost (average)			2.00
Total out-of-pocket cost			$3.26

Transportation

The gathering systems in the fields generally make use of small pipe lines, although in some fields, as at Emlichheim, trains of small, narrow-gage tank cars are used. Most of the refineries are situated near large centers as Hannover, Hamburg, etc. Transportation from gathering points to refinery is effected to some extent by tanker barge on the canals. But far the greatest bulk and mileage is handled by standard railway tank cars. At the present time, only two small oil pipe lines are in use—one, a 5-mile line (6 and 8-in.) from Reitbrook to the Elbe River, and the other a 4-mile (2 and 4-in.) from Georgsdorf to a loading point on the railway. A 48-mile gas line connects Bentheim gas field with the Buna works.

Refineries

There are in all 24 refineries operating in Germany. These vary greatly in capacity and in the nature of their products. The combined charging capacity is 64,000 bbl. per day. This is 15 per cent in excess of estimated current requirements. Refinery men claim that, as now rehabilitated, these refineries are capable of supplying Germany's internal needs and also providing an exportable surplus of lubricants. Thus Germany is in a position where she need import only crude instead of the more expensive products.

Conclusions

The present status of German petroleum production may be summarized as follows:

	Barrels
Total production to date (all fields)	84,000,000
Reserve (proved fields):	
In sight	58,000,000
Probable	28,000,000

To this may be added the possibility of new discoveries. Without erring too far on the side of optimum, it may be stated on geological information that there is a 50-50 chance of adding another 80 to 100 million barrels to the reserves of northwest Germany. This is contingent on whether the industry can support the excessive cost of wildcat drilling. The records of the past do not look too hopeful.

The possibility of other petroliferous provinces in Germany deserves mention. The records of the Thuringia Forest, Upper Rhine basin and Baden are far from encouraging. The Molasse basin, lying in the Alpine foreland across southern Bavaria and Wuertemberg, has been a subject of interest for some years. Exploration and development work have been slow. Studies of the surface geology have been thorough, but much more work must be done especially along the lines of deep geophysical research and deep core drilling before final judgment can be passed on this area.

The question naturally arises as to whether oil production in Germany can pay. On the basis of a free world market, the past records indicate prohibitive production costs. In a closed national economy, however, dollars and cents do not always give the entire answer. Practice that would be suicidal on a competitive international market may, under special circumstances, be justifiable within

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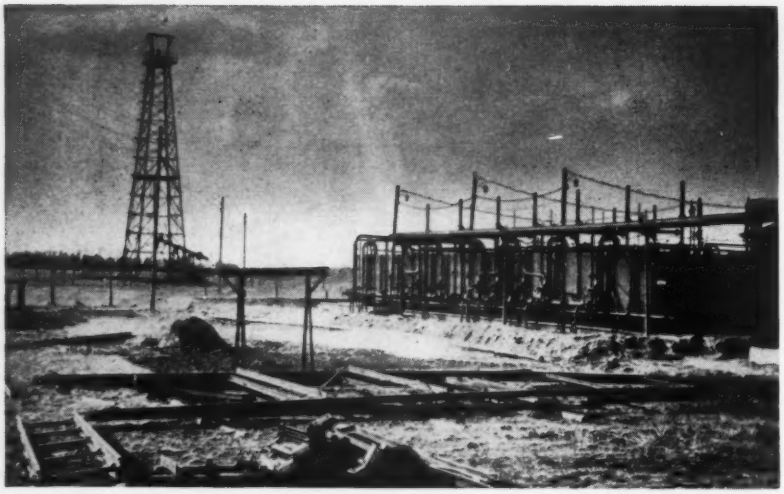

A scene in Emlichheim field

one's borders. This was especially true of Germany during the war years. Although it is to be hoped that such a contingency does not arise again within the foreseeable life of their oil fields, Germany today faces a somewhat analogous situation. The need for petroleum is urgent. There are but two alternatives: import it or produce it.

Until German industry is rebuilt to a point where exports will permit of foreign purchases, importation of petroleum will be extremely difficult. In fact, it would be quite impossible except under a system of gratuities as that prevailing at present or some possible extension of international credit. From all present knowledge, it is not to be hoped that Germany will ever be in a position to fill all of its requirements; but every barrel that can be produced eases the situation, even though the costs appear excessive. In this way, exports can be released for other much needed raw material and food.

TABLE 1—OLDER OIL FIELDS—PRODUCTION

Field—	Brought in	Production, bbl. Cumulative to July 1, 1948	Production, bbl. Per day 1948	Estimated reserves end of 1948, bbl. In sight	Estimated reserves end of 1948, bbl. Probable
Hannover basin:					
Broistedt	1937	176,323	89	140,000	
Calberlah	1945	9,366	9	7,000	
Eddesse	1876	1,624,000	52	84,000	
Eicklingen	1937	1,657,866	296	301,000	
Etzel	1942	135,345	103	210,000	
Fuhrberg	1939	2,509,815	1,030	1,575,000	
Gifhorn	1935	273,385	28	28,000	
Hademstorf	1941	257,705	143	210,000	50,000
Hanigsen	1940	(*)		770,000	
Hohenassel	1943	888,391	415	700,000	600,000
Molme	1935	899,157	100	98,000	
Nienhagen	1904	31,859,856	2,800	5,950,000	700,000
Oberg	1919	2,180,248	123	175,000	
Steimbke	1936	2,847,012	900	1,540,000	500,000
Thoren	1941	857,353	362	700,000	350,000
Wesendorf	1943	1,469,251	1,120	4,200,000	2,800,000
Wietze	1874	16,374,526	500	1,960,000	
Total		64,019,599		18,646,000	5,000,000
Schleswig-Holstein Hamburg:					
Heide	1935	8,318,156	1,100	1,750,000	1,400,000
Meckelfeld	1938	308,000	40	60,000	
Reitbrook	1937	8,012,823	855	1,400,000	
Total		16,638,979		3,210,000	1,400,000

*Included in Nienhagen.

TABLE 2—ANTICLINAL FIELDS OF EMSLAND

Field—	Producing horizon: Name	Age	Lithology	Gravity of oil, °A.P.I.	Depth to top of pay (ft.)	Average thickness of pay (ft.)	No. of sands	Proved acreage
Adorf	Wealden	L. Cretaceous	Shell debris	13°	3,600	200	1	100
Emlichheim	Bentheim	Valendis	Running sand	30°	2,500-2,860	88	2	550
Georgsdorf	Bentheim	Valendis	Sandstone	25°	1,800-3,000	120	2	2,000
	Wealden		Shell debris			20	1	
Lingen-Dalum	Bentheim	Valendis	Sandstone	32°	2,800-3,100	25	2	2,060
	Serpulite	Malm	Limestone			Local lenses	1	

Field—	Prod. began	Dly. rate 1948 (bbl.)	Cumulative production to July 1, 1948 (bbl.)	Estimated reserves in sight	1948 probable	Est. production, 1965: Per day	Est. production, 1965: Cumulative 1948-1965	Prod. wells, 1948: Natural flow	Prod. wells, 1948: Pumping	Prod. wells, 1948: Total
Adorf	1948	....	.....	500,000	1,000,000	200	1,400,000	1	..	1
Emlichheim	1944	1,267	827,239	14,000,000	7,000,000	1,150	14,500,000		21	21
Georgedorf	1944	1,000	543,935	14,000,000	7,000,000	2,000	14,000,000	33	5	38
Lingen-Dalum	1942	950	1,012,158	8,000,000	7,000,000	500	5,800,000	...	27	27
Total			2,083,332	36,500,000	22,000,000		35,700,000	34	53	87

Terms for $75,000,000 Loan Completed by Jersey

Standard Oil Co. (N.J.) has completed negotiations to borrow $75,000,000 from a group of insurance companies and other investing institutions for the long-term financing of its 30 per cent purchase in Arabian American Oil Co.

The 3 per cent promissory notes due February 1, 1979, were sold privately by Morgan Stanley & Co. The Jersey company paid Arabian American in December more than $75,000,000, which with other sums was used to prepay in full a bank loan guaranteed by Jersey to the extent of $76,500,000.

Japan to Get Persian Oil

Approximately 630,000 bbl. of heavy oil are currently being lifted at Bahrein Island in the Persian Gulf for use in Japan. The Japanese Ministry of Transportation has scheduled five tankers for the movement which will take place during the January-March period, according to reports from Tokyo.

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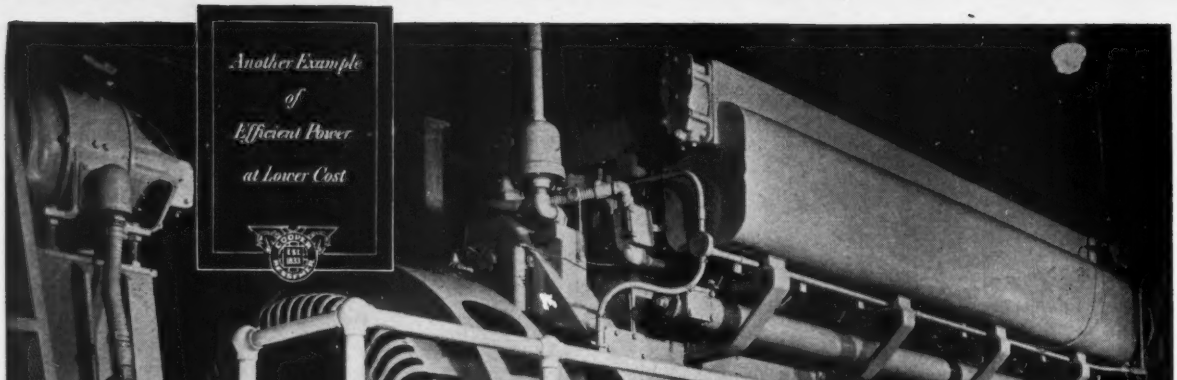

Nantucket's new supercharged, 1000 hp Cooper-Bessemer diesel, operating with entire satisfaction and clear exhaust on Sun No. 11 gas enrichment oil. Unit, driving G-E generator, was installed by Hayes Pump & Machinery Company, Boston, Mass.

Nantucket's New Diesel Burns Heavy Fuel

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Secondly, extremely close speed regulation was essential. The new unit was to be paralleled with the turbine generators and was to power an aircraft radio beam requiring exceptional cyclic control. Here again Cooper-Bessemers offered proved performance.

These and other problems in this unusual installation, *including the elimination of smoke*, despite the heavy fuel, were overcome right from the start. Consequently, the new engine went into service at once. And, by burning heavy fuel instead of regular diesel fuel, it is estimated that the new Cooper-Bessemer will save $11,950 a year at present fuel rates.

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Texas Allowable Reduced Another 200,000 Bbl. Daily for March

HOUSTON.—For the third consecutive month, the Texas Railroad Commission has reduced the state's allowable crude production by a sizable amount.

A reduction of 200,083 bbl. daily—a cut of 8 per cent as compared with February—has been ordered for March, making the calendar day's crude allowable 2,216,318 bbl. Previous monthly cuts were 250,985 bbl. in January and 66,188 bbl. daily for February. Thus the 3 months' cut amounts to some 515,000 bbl. daily.

The latest reduction will be accomplished by putting all prorated fields, except East Texas, on a 23-day producing month. This is the same number of producing days as last month, but February had three fewer calendar days. Hence the per-day allowable is reduced. East Texas will be cut from a 20-day to a 19-day basis.

The March allowable is 183,682 bbl. under the Bureau of Mines estimate for the month. However, with distillate and natural gasoline added to the crude allowable the state's total is 70,612 bbl. over the Bureau of Mines estimate. March allowables and changes by districts as compared with February allowables are:

1. Southwest Texas—28,417, down 1,184.
2. Southwest Texas—142,044, down 14,742.
3. Gulf Coast—423,682, down 35,546.
4. Southwest Texas—211,539, down 19,405.
5. East Central Texas—42,261, down 4,028.
6. East Texas field—101,724, down 8,986.
6. East Texas (other)—277,091, down 43,984.
7-B. West Central Texas—65,850, down 3,059.
7-C. West Central Texas—48,251, down 3,858.
8. West Texas—627,953, down 58,206.
9. North Texas—146,435, down 7,062.
10. Panhandle—101,071, down 23.

Nominations by crude-oil purchasers for March production were 2,646,983 bbl. daily—a decrease of 139,305 bbl. from the previous month. The major portion of this decrease was accounted for by West Texas where a cut of 60,758 bbl. was requested.

In the testimony preceding the Commission's action, primary attention was directed towards West Texas. Ralph Dietler, chairman of the board of Stanolind Purchasing Co., stated that his company is in distress for storage in the area. He stated that stocks of West Texas crude have increased 2,000,000 bbl. since January 1, 1949, and that Stanolind alone has stored an average of 42,000 bbl. daily in West Texas during the current month. Dietler told the commission his company would have 10,000,000 bbl. of sour crude in storage by March 1 which will exhaust its storage facilities for this type of crude. In summary, the Stanolind representative favored a sizable cut in West Texas production with other areas held the same.

Dietler's recommendation for a cut in West Texas allowables was concurred in by representatives of Shell Oil Co., Inc., Cities Service Oil Co., and Phillips Petroleum Co.

Commissioner E. O. Thompson favored an "across the board" cut in discussion with Dietler during the hearing. The commission order following the hearing made such a cut, with no special treatment for West Texas.

Harry Jones, representing W. L. Pickering of Dallas, requested that the commission restore its order exempting the Little Kentucky field of Jackson County from shut-down days. His request was granted by the commission.

Maston Nixon of Southern Minerals Corp. of Corpus Christi made an offer during the hearing which contrasted sharply with West Texas testimony. He offered to take on any connections at posted prices in fields where his company operates. Operations of Southern Minerals are primarily in District 4 (Southwest Texas).

During a discussion of Districts 5 and 6 (East Central Texas and East Texas), Hiram Brown of Talco Pipe Line Co. commented there is no market for heavy residual crude. Brown told the commission his company has contacted every likely purchaser in the United States. The Talco representative asked the commission to continue February allowables for March in the heavy-crude fields where his company obtains oil.

The next state-wide proration hearing is scheduled for the Plaza Hotel in San Antonio on March 15.

Administration Seeks More Than 5.5 Billion for European Recovery

WASHINGTON.—The administration last week asked Congress for $1,150,000,000 to carry the European Recovery Program through the April quarter of this year and for $4,430,000,000 in appropriation and contract authorization for the fiscal year which begins July 1.

The sum requested for the next fiscal year would be $770,000,000 less than was provided for the first 12 months of Economic Cooperation Administration operations, but Cooperation Administrator Paul G. Hoffman, at the opening of hearings before the House and Senate foreign committees, meeting together, indicated that the total asked might not prove to be enough, in which event additional funds will be sought.

The uncertainty over the exact amount that will be required is due to the fact that current estimates cover the deficiency between the anticipated financial resources of the Marshall plan countries and their total needs. Last year the estimates were based almost entirely upon needs, since few of the Western European countries had much in the way of dollar resources.

The total requirements of the Western European countries during the coming fiscal year are estimated at something like $7,300,000,000, of which they will be able to finance approximately $3,000,000,000, leaving $4,280,000,000 to be furnished by the United States. The $4,430,000,000 request includes $150,000,000 to be authorized for contracts to be made during the year but not paid until later.

Oil Needs Unknown

So far as petroleum or any other specific commodity is concerned, it is not expected that ECA officials will be able to put their finger on any fixed amount and say that is what will be required, since it will be left to the individual countries to determine how funds allotted to them are to be spent. Thus, one country may be in a position where it feels it will be best to use ECA funds to finance petroleum purchases and expend its own resources on other commodities, say cotton, while another might feel it more prudent to get cotton through ECA and buy its oil independently.

Roughly, it is estimated that Western Europe will need between $1,200,000,000 and $1,300,000,000 worth of oil during the coming fiscal year, of which $500,000,000 to $575,000,000 will be dollar oil and $700,000,000 or a little more nondollar.

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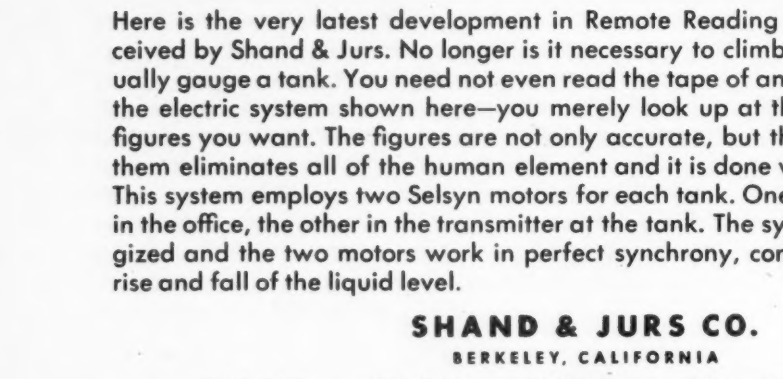

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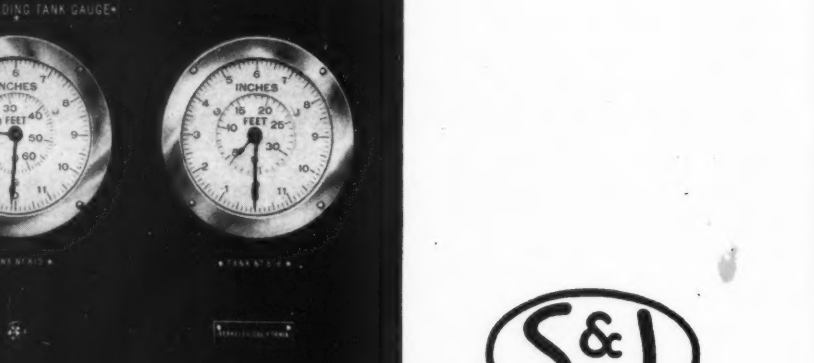

SHAND & JURS

WASHINGTON WATCHING

BY BERTRAM F. LINZ

Tighter Controls Needed

WASHINGTON. — Extension of the export control authority by Congress will give the Office of International Trade opportunity to attack what now is considered a major problem—the transshipment to countries behind the iron curtain of commodities from the United States which have a strategic value.

Included in these commodities are lubricating oils, carbon black, a number of chemicals, and other products, both on and off the positive list of commodities requiring individual license for export.

OIT officials are considering an approach to the problem which would involve requiring individual licenses for such commodities, the applications to be carefully screened and those to destinations from which transshipment would be easy to be denied.

Export interests that have been consulted, however, declare this would not be an effective way of dealing with the situation, while making it more difficult than ever to do business abroad. They recommended that the best approach is to secure the cooperation of the governments of the countries to which exports are destined or a check by American consuls or ECA officials within those countries.

Exporters also contend that the "sore spots" from which goods are being transshipped are well known and that the matter could be handled by watching the exports to those areas. Included in these sore spots, it is said, are Hong Kong, from which shipment to Communist-controlled North Korea is easy; Switzerland, which is a participant in the European Recovery Program, and a few other countries which are doing business on both sides of the iron curtain.

Numerous conferences are being held in the various commodity divisions of OIT, the result of which may be the development of a new positive list of strategic commodities, which would include lubricating oil over which a general-license control only is now exercised.

Republicans Test Strength

WHILE administration forces have the House of Representatives pretty well under control, they are finding it more difficult to run things their own way in the Senate where last week the labor committee's plans for cutting short hearings on repeal of the Taft-Hartley Act were overturned, although they had an 8-to-5 majority.

Republicans on the committee secured a lengthening of the hearings by the simple expedient of questioning witnesses at length, slowing up the proceedings so that, despite day and night sessions, there were still 30 witnesses to be heard as the scheduled closing approached.

In the showdown, the committee vote to extend the hearings was unanimous, but the Democrats simply were outmaneuvered.

The immediate effect will be to delay getting the bill to the Senate for debate, but the long-range effect may be considerably more important, since the Republicans showed that they can muster up enough strength to fight off the administration forces on matters on which the Democrats themselves are not united.

The administration has a majority in the Senate, on paper, of 12 votes, there being 54 Democrats and 42 Republicans, but it takes a switch of only 7 Democrats to defeat the administration on any issue, and observers see from 6 to 10 switching on every important measure, their identity depending on how a particular measure affects their local interests.

Uncoordinated Coordination

OIL men who attended Senator O'Mahoney's hearings on the Interior Department are wondering a bit why the Oil and Gas Division doesn't begin its work of coordinating government oil activities at home.

Apparently aiming at keeping interest in synthetic fuels at fever heat, James Boyd, director of the Bureau of Mines, told the committee that recent trends indicate that we must increase petroleum imports to keep industrial activity at its present high level.

Boyd prepared his testimony without consultation with the OGD, whose acting chief, Robert E. Friedman, foresaw a probable falling off of imports as a result of the balance between supply and demand which has been attained by the industry. Friedman indicated that we could get back on an export basis if export controls were lifted, although ultimately we will again be a net importer.

The two agencies are located not too far apart in the Interior Department Building, but the variance in views indicates they are far from "coordinated."

It just shows the difficulty of getting government officials to agree to anything that makes the need for their pet projects less pressing, and how each looks at the same situation from a different standpoint. While the OGD is able, willing, and ready to furnish other agencies with all the facts available and with well-reasoned recommendations on policy, one agency believes that the threat of having to rely upon imports may expedite development of synthetic fuels; another would like imports kept high, regardless of conditions, so as to conserve domestic resources against a possible emergency; and still another believes imports should be encouraged in the interest of a free international trade, and so on down the line.

Omnibus Bill

KEEP an eye on Congressman John C. Sanborn of Idaho.

Sanborn may achieve fame by wrapping up the cure for all the ills of the nation in one legislative package or he may merely win the award for writing the longest title for any measure introduced in the Eighty-first Congress.

In the view of the Idaho representative all our troubles can be remedied by strict observance of the Constitution and an 1893 act of Congress, all summed up in H. R. 2573:

"A bill to promote the general welfare by scrapping the unsound and ruinous monetary policy which is wrecking our domestic economy and creating chaos throughout the world, and replacing it with a sound monetary system in strict accordance with Article I, Section 8, Clause 5, of the Constitution of the United States and the act of Congress of November 1, 1893 [Section 311, U. S. C. Annotated (ch. 8, 28 Stat. 4)], which will stabilize the currency; prevent economic collapse in the United States; give economic stability to the rest of the world; stop Communism and other forms of absolutism; insure peace by eliminating the cause of war; save for the American taxpayers most of the billions of dollars proposed to be spent under the European recovery program; reduce taxes; protect our national sovereignty; preserve the American way of life; raise the American standard of living; quadruple the recoverable mineral wealth of America; make possible the profitable production here at home of 99 per

XUM

cent of our mineral requirements, including strategic minerals; and usher in an era of the greatest prosperity the United States has ever known."

In slightly fewer words, all we have to do is go back to the silver standard which was such an issue in the nineties.

Public-Relations Job

THE National Petroleum Council is doing a big job for the industry, currently preparing to distribute 35,000 copies of its report on national oil policy to inform the largest possible number of people who may have an interest in the subject.

Now coming off the press, printed copies of the policy will be sent to libraries, colleges and universities, press and radio organizations, manufacturers of oil-using equipment, and a number of selected other groups, including, of course, petroleum associations and other oil interests.

In this way NPC hopes to get the basic information regarding our oil policy into the hands of those who have an intellectual or practical interest in the subject, which affects everybody in the country but in the past has been dealt with only by Congress and spokesmen for the industry.

As the oil industry learned about a year ago, one of its major handicaps was a lack of informed knowledge on the part of the public as to what made the wheels go round. It quickly moved to overcome that handicap by a big-time publicity campaign, but there is still much that the public should know about oil in general and the motives and purposes of the industry, if for no other reason than the permit it to evaluate properly the steps proposed by the administration and Congress to deal with oil problems.

Killing Golden Goose

ECONOMISTS who follow the trend of taxes are beginning to wonder how long it will be before the greediness of the states prices gasoline out of the market for a large segment of the population and invokes the law of diminishing returns.

Attempts to increase the gasoline tax are expected in some 30 states this year, and bills to that end already have been introduced in 16 legislatures. While Colorado and Kansas are considering a reduction in rate, 2-cent increases have been proposed in Indiana, Minnesota, North Dakota, Utah, Wyoming, and New Mexico, and lesser increases in 10 others.

In New York, Gov. Thomas E. Dewey has proposed a 1-cent increase in the gasoline tax to provide funds for activities other than road building, in effect asking motorists to kick in $20,000,000 for the benefit of nonmotorists. That increase would make the state's take from gasoline $100,000,000 a year, almost 11 per cent of Dewey's $936,000,000 budget.

New York has long been noted for its disregard of the basic theory that gasoline-tax revenues are designed to finance highway improvement and maintenance, but there is a growing tendency on the part of the states generally to use the motorist as a source of easy money for other purposes.

Most of the states not already there appear to be aiming at a 6-cent tax, although New Mexico is seeking 7 cents and Louisiana is still higher. With the federal tax on top of this, gasoline already is quite expensive for jalopy owners in the lowest income brackets, and if the upward trend continues, even a very mild recession might have impressive effects on state revenues.

Mason Airs His Views On Basing Point Pricing

AS a result of certain recent court decisions the "entire oil business in Oklahoma is operating under the shadow of illegality." This was the opinion expressed by Lowell B. Mason, acting chairman of the Federal Trade Commission, last week in an address before the Purchasing Agents Association of Tulsa.

Leaving his "ivory-towered" offices in Washington to express his convictions on the basing point pricing question to business men and in turn learn their views on the subject, Mason urged oil-industry men to make known their stand to their senators and congressmen. Approximately 200 purchasing agents and oil industry officials attended the Tulsa meeting.

Without commenting on the provisions of the Walter moratorium bill in the House nor the Johnson basing point bill in the Senate, Mason said that the philosophy of both bills was to preserve "the right to independently use delivered price systems or absorb freight to meet competition in any and all markets if the same is done in the absence of conspiracy or combination."

"I've come to Oklahoma to see if I can find some folks who believe in equal justice under the law," Mason told the group. He made it clear that his statements were not to be interpreted as the official view of the commission.

"If your gasoline producers believe Senator Johnson and Congressman Walter are wrong and the Federal Trade Commission is right, then they should move their refineries out of Texas, Kansas, Missouri, and Oklahoma nearer to Whiting, Bayonne, and Marcus Hook so they won't have to systematically absorb freight to sell in the large centers of population.

"If you think Johnson and Walter are right and you want the refineries to stay here you ought to let your own senators and congressmen know your views.

In his address entitled "Lets Give Business the Job, Not the Works," Mason emphasized that it was the smart competitor that forces the price down and explained that "under bureaucratic dictation or private monopoly 'every independent business man is robbed of the power to make his own decisions."

Mason has long expressed opposition to the decisions of his fellow FTC members and has maintained that by their recent case decisions the basing point and zone pricing system has been outlawed.

FTC Moves to Prevent Quantity Discounts

WASHINGTON.—The Federal Trade Commission has announced its intention of establishing quantity ceilings "where this appears necessary" to prevent the granting of quantity discounts which are unjustly discriminatory or promotive of monopoly, as provided for in the Robinson-Patman Act.

The commission's action was based on a Supreme Court decision in the Morton Salt Co. case holding illegal the setting up of a discount schedule under which the most favorable terms were available only to a limited number of chain organizations so that wholesalers who purchased in volumes almost equally great were unable to secure supplies at a price which would permit their retailer customers to compete with the chain stores.

FTC to Investigate Discounts

Under the announced procedure the FTC will investigate discounts allowed by producers on specific commodities or classes of commodities, obtaining information as to the quantity differentials granted to purchasers, the number of available purchasers of given quantities, and other facts bearing upon the competitive conditions existing in the distribution of the commodity, and may promulgate rules fixing and establishing maximum quantities beyond which differentials on account of quantity may not thereafter be granted.

Under the Robinson-Patman Act, these quantity limits may be established by the commission wherever it finds that available purchasers in greater quantities "are so few as to render differentials on account thereof unjustly discriminatory or promotive of monopoly in any line of commerce."

Oral Arguments Ordered on Filing Of Texas, Louisiana Tidelands Suits

WASHINGTON.—The Supreme Court this week ordered oral argument as to whether the Department of Justice should be permitted to file original suits against Texas and Louisiana as the tidelands fight moved ahead on two fronts.

In Congress, Sen. Joseph C. O'Mahoney of Wyoming introduced the bill for federal administration of the tidelands sent to the Capitol by Atty. Gen. Tom C. Clark, Defense Secretary James V. Forrestal, and Secretary of the Interior J. A. Krug.

The court's order for argument followed the filing by the Department of Justice of its response to the briefs of Texas and Louisiana challenging the Government's effort to add their underwater oil lands to those of California, already held by the court to be under the jurisdiction of the United States.

Court attaches said the issue probably would be reached for argument some time in April, making it a foregone conclusion that, if accepted, the cases against the two states could not be heard until toward the end of the year, when the court reconvenes after its summer recess.

In introducing the administration bill, O'Mahoney emphasized he was doing so by request and in announcing his action from the Senate floor asked merely that the text of the letter from the three cabinet officers, which accompanied the legislation, be inserted in the Record.

Privately, Sen. J. C. O'Mahoney expressed his dissatisfaction with some provisions of the measure, particularly its failure to provide for disposition of the royalties and other revenues which the Government would derive from the tidelands oil deposits. Suggestions are being made that the tidelands revenue be devoted to educational aid which President Truman has included in his legislative program. Heretofore, leasing legislation, including the tidelands bill sent to Congress last session, has earmarked part of the revenues for the reclamation fund and another part for the states in which the oil is produced, and O'Mahoney is in favor of retaining that policy.

Asking the court to disregard the protests of Louisiana and Texas over the suits to seize their offshore oil lands, the Department of Justice declared them without merit.

The department argued it was unnecessary either to hold up the litigation until Congress has enacted legislation asserting federal jurisdiction over the tidelands or to initiate the litigation in a Texas federal District Court, as contended by Texas Atty. Gen. Price Daniel.

Wyoming Crude Price Adjustments Made

EASTERN Wyoming crude-oil prices formerly paid by the Cooperative Refinery Association and Gray Oil & Refining Co., have been adjusted downward in some cases 15 cents per barrel, to match the prevailing Rocky Mountain scale. Effective February 15, 1949, the Cooperative posted a price scale with a top of $2.65 per barrel for 40° gravity and above crude from Skull Creek, Fiddler Creek, Mush Creek, Osage, and Ant Hills. It also posted a top price of $2.65 per barrel for crude from Lance Creek, Mule Creek, and West Mule Creek, which prices represent no change. The new prices were promptly met by Gray Oil & Refining Co.

The effect of these changes is to bring prices paid by the Cooperative and Gray in line with the standard price scale in the Rocky Mountain area. Their previous price postings amounted to a 15-cent-per-barrel premium for Skull Creek, Fiddler Creek, Mush Creek, Osage, and Ant Hills. It is reported that Cooperative was buying and shipping crude to its Scotts Bluff, Neb., refinery, and formerly to assure sufficient for its Newcastle, Wyo., plant as well as the Scotts Bluff, posted a scale 15 cents above the prevailing market, for crude from fields adjacent to its Newcastle plant.

The Cooperative plant at Newcastle is rated at 2,000 bbl. daily skimming capacity with about 900 bbl. daily thermal cracking facilities. The Graco refinery at Newcastle is rated at 2,500 bbl. daily skimming capacity. The Cooperative plant at Scotts Bluff is rated at 1,600 bbl. daily skimming capacity with around 600 bbl. daily thermal cracking facilities.

Most crude-oil buyers interpret the Wyoming changes as simply an indication of an easier crude purchasing position locally, which wipes out the necessity of paying a premium for local position value. They do not believe it indicates any general weakening of the crude-price structure.

Barnsdall Names Hatch And Johnston Directors

At a recent board of directors meeting of Barnsdall Oil Co. held in Los Angeles, two new directors were elected, Boyd Hatch and Oswald L. Johnston, both of Atlas Corp. They succeed E. B. Reeser, retired former president, and Theodore N. Law, grandson of the founder of the company, both resigned.

Present board members are: William Dewey Loucks, chairman; James A. Dunn, D. R. Snow, W. C. Whaley, R. A. Broomfield, O. L. Cordell, D. L. Frawley, Floyd B. Odlum, George Howard, Boyd Hatch and Oswald L. Johnston. The last four named are representatives of Atlas Corp., which has assumed a commanding position through stock purchases.

Next Week

Hunt Oil Co.'s two new gasoline plants.—The Journal's district editor D. H. Stormont, reports on design and engineering details of these operations, one in East Texas, the other in Northern Louisiana.

Shell Oil's Houston refinery.—For the latest "turnaround" of the plant's 25,000-bbl.-per-day cat cracker, the Journal presents a pictorial sequence of the major operations entitled "Tour of a Turnaround."

Water supplies.—Factors involved in development of ground water as a supply source of industry will be covered in two articles.

Wertz Dome, Wyoming.—Unitization of field and operation under pressure-maintenance program.

Tubing tool joints.—Description of this equipment on Gulf Coast workover and completion operations, where production tubing is used for the drill string.

Muskat series on reservoir engineering.—Second summarization report, "Condensate Reservoirs" will appear; from recent presentation at University of Texas petroleum engineering conference.

Problems in foundation settlement.—Factors in considering construction of foundations for heavy refining and other plant equipment.

New induction logging system.—Principles of this new electrical logging method are outlined together with application to logging problems for oil-base muds.

Producing formations of Southeast Ohio.—This area long has had many secondary-recovery operations under way and author O. C. Dunn, Jr., consulting engineer, summarizes all available geological data.

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PERSONALS

A.P.I. Production Head Has Wide Experience

WITH more than 30 years of experience in production of oil, and as a drilling contractor, R. L. Wheelock, president of Wheelock & Collins, Corsicana, Tex., knows his job well as vice president of production for the American Petroleum Institute.

Wheelock first entered the oil business in 1918 as a drilling contractor. As he gleaned wide experience in the years to follow, he entered the production field as an independent oil producer. He is also familiar with oil financing, having served as a director of the First National Bank of Corsicana.

A native of Troup, in Smith County, Texas, Wheelock was named vice president for production at the twenty-eighth annual A.P.I. meeting held in Chicago last November.

Active in civic affairs, he served at one time as mayor of Corsicana. In March 1945 he was elected president of the Texas Hereford Association.

S. V. McCollum, regional petroleum engineer, Continental Oil Co., Fort Worth, Tex., has been promoted to assistant purchasing agent at Ponca City, Okla. He has been with the company 10 years.

Afton D. Puckett, E. I. du Pont de Nemours & Co., Inc., has been promoted to district laboratory coordinator in the petroleum chemicals division, and **John N. C. Cameron** has been named manager of the division's Gulf Coast district laboratory, Houston. The division markets tetraethyl lead antiknock compounds and petroleum additives. Puckett has been with du Pont for 1 year, and Cameron comes to the company from Humble Oil & Refining Co.

George A. Lloyd, Esso Standard Oil Co., New York City, has been named assistant manager of public relations for the company. He joined Esso Standard 25 years ago at the Bayway refinery, Linden, N. J., and was appointed head of the light oil treatment department in 1933.

Fred McKinnon, formerly with Imperial Oil, Ltd.'s, producing department, will soon assume the position of exploration manager for Royalite Oil Co., Ltd., Calgary, Alta. **George E. Jones,** formerly chief scout for Imperial, has joined Royalite's Exploration department.

I. W. Hartman has announced his resignation as president, director and general manager of the Gordon Oil Co. and Gordon Drilling Co., effective early this month. He has been associated with the Gordon organizations the past 15 years and president for 6 years. Hartman plans to continue in the oil business on an independent basis. At the same time it was announced that **Earl Hartman,** who has been vice president of the Gordon Oil Co., will become the new president and general manager.

Harry Gaspeny, Pure Oil Co. scout, was elected president of the Michigan Oil & Gas Scouts Association for 1949.

Robert N. Williams, Honolulu Oil Corp. district geologist, Santa Barbara, Calif., has resigned to enter consulting work. He will have offices with the firm of Penfield & Smith, civil engineers, and will do consulting on both water and oil problems in Santa Barbara. Before being assigned to Santa Barbara, he was district geologist for Honolulu in Bakersfield, Calif.

Harry A. Tallman, Tulsa, has been appointed manager of the legal division, Deep Rock Oil Corp., succeeding **William F. Semple,** retired.

Everett Dobson, who serves as chief petroleum engineer for The Texas Co.'s subsidiary, La Junta Petroleum Co., has returned to Colombia following a lengthly visit in the United States. During his visit, Dobson attended the American Petroleum Institute meeting in Chicago and visited drilling and producing operations in both California and Texas.

Baxter F. Ball, Northern California division manager of General Petroleum Corp., has been elected president of the San Francisco, Calif., chapter of the National Safety Council.

P. W. Orvis, industrial relations, producing department, Socony-Vacuum Oil Co., Inc., returned to the company's New York headquarters recently after a 4-month tour of Persian Gulf and Middle East operations as a member of the Aramco Tapline personnel advisory committee.

Raymond H. Crowe, Stanolind Pipe Line Co., has resigned as pipeline construction engineer to accept a position with Stone & Webster Service Corp., New York City, as head of an engineering staff which will certify construction by Fish Engineering Corp., Houston, of Transcontinental Gas Pipe Line Co.'s $190,000,000 line from southern Texas to New York City. Crowe's staff will be headquartered in Houston. He joined Stanolind in April 1933 as a photostat operator in the engineering department, and advanced to junior engineer in 1935.

B. B. Jennings, president, and **Charles Harding,** director in charge of Middle East operations, Socony-Vacuum Oil Co., Inc., are visiting the company's operations in Saudi Arabia and other points in the Middle East. **John C. Case,** vice president of Socony-Vacuum Oil Co., Inc., in charge of producing, is now in Cairo, Egypt, where he will remain until after March 1.

J. Gilbert, head draftsman, producing department, Pacific Coast division, The Texas Co., has been appointed assistant to the division geologist. **V. I. Coppard** succeeds Gilbert as head draftsman. Gilbert joined the company in 1929 as junior draftsman, and Coppard started with the company as draftsman in 1935.

Six oil-company officials are included among the members of the newly constituted board of directors of the National Foreign Trade Council, Inc. They are: **A. A. Garrabrant,** Atlantic Refining Co., newly elected; **W. J. B. Dixon,** The Texas Co.; **Walter L. Faust,** Socony-Vacuum Oil Co., Inc.; and **Clarence E. Meyers,** Standard-Vacuum Oil Co., reelected; **E. F.**

PERSONALS

Johnson, Standard Oil Co. (N.J.), and **A. E. Thayer,** California Texas Oil Co., Ltd., holdover directors.

A. F. HAGEN

Alfred F. Hagen, Shell Oil Co., Inc., Houston, has been appointed treasury manager for the Houston area, replacing **E. R. Mueller,** who has been named manager of the accounting department in New York. Hagen has been with Shell since 1923, starting as a clerk on the Pacific Coast. In 1945 he was made assistant general auditor in the San Francisco office, which position he held until his present appointment in Houston.

Edward C. McLean, Beacon Petroleum Co., Tulsa, has been appointed manager of the new Chicago office recently established. He formerly was district manager for United Petroleum Gas Co., Chicago.

Officers of Stanolind Oil Purchasing Co., Tulsa, were reelected at the annual meeting of the board of directors February 7. They are: **Ralph O. Dietler,** chairman of the board; **A. C. Sailstad,** president; **D. L. Wolfe,** vice president; **F. J. Ryan,** treasurer; **L. M. Jones,** secretary; **R. W. Boyd,** controller; **George C. Getgood,** assistant secretary; and **H. L. Crosby,** assistant treasurer.

Robert M. Leibrock, petroleum engineer for Stanolind Oil & Gas Co., Tulsa, has been transferred to the Lubbock, Tex., district. Changes in the company's North Texas-New Mexico division included: **James C. Farris,** petroleum engineer, has been transferred to the Fort Worth division office from Brownfield **Lewis M. Thompson,** petroleum engineer, transferred from Levelland to the Lubbock district **Charles A. Lutz,** formerly farm boss in the Slaughter area (Brownfield), was named production foreman in the East Texas area, at Longview; **Frank V. Cooksey,** from the East Texas area, was named field engineer at Slaughter. **Hally J. McIlnay,** formerly head roustabout at the Salt Creek gasoline plant, Midwest, Wyo., was transferred to the Slaughter gasoline plant at Levelland as maintenance foreman; **James B. Howell,** farm boss, was transferred to the Hogback area, Farmington, N. M., from the Slaughter area; and **Harold D. Wash** will move from Odessa to the Hendrick area at Wink, as farm boss. Wash was formerly head roustabout in the North Cowden area.

J. M. Cunningham, executive assistant to the Louisiana conservation commissioner, has resigned to take up private consultation work. His position with the commission will not be filled for the present.

Dr. Lester M. Goldsmith, vice president and chief engineer for Atlantic Pipe Line Co. and chief engineer for Atlantic Refining Co., was in South Texas last week inspecting progress on a 400-mile 10-in. crude line under construction. The new Atlantic line will run from Refugio County in South Texas to Crane County in West Texas. **C. E. Mullins,** Philadelphia, manager of construction for Atlantic; **J. H. Wood, Jr.,** Dallas, vice president of Atlantic Pipe Line Co.; and **Ralph Paden,** Dallas, general operations superintendent for Atlantic, accompanied Dr. Goldsmith on the tour.

H. O. Woodruff, assistant to the manager, Pacific Coast division, The Texas Co., has been appointed assistant manager of the production department, Pacific Coast division. He joined the company in 1933 as a roustabout, and in 1937 was transferred to Signal Hill as assistant petroleum engineer. In 1939 he became development engineer at Coalinga; in 1942 was made district engineer, Los Angeles Basin district; acted as division engineer for several months during 1946; and was transferred to Los Angeles to serve in that capacity again in October 1947. He was named assistant to the division manager in 1948.

Miss Bettye M. Bohanon, formerly assistant secretary of Independent Tankships, Inc., a subsidiary of American Independent Oil Co., in Washington, has been appointed assistant secretary and assistant treasurer of Conorada Petroleum Corp. Miss Bohanon, who has spent nearly 19 years in the oil industry, formerly was executive secretary of the central committee of the California Oil Producers, during the war a production and priorities specialist with PAW, and from 1944 to 1946, assistant petroleum attache with the State Department stationed in Lima, Peru.

Fred Briggs, Jr., until now materials engineer in the foreign producing department of The Texas Co., has been promoted to supervising engineer.

L. R. Goldsmith, superintendent of Wilmington - Dominguez refinery, Shell Oil Co., Inc., has been transferred to the company's New York office, and will be in economic development department, headed by **N. J. McGaw,** vice president. **S. J. Meisenburg** will replace Goldsmith as refinery superintendent. Goldsmith has been with Shell since 1932, and Meisenburg joined the company in 1935.

W. Jess Price, who has been superintendent for Texas Petroleum Co., in Colombia, has accepted a position as drilling supervisor with George Livermore, Inc., in Chile.

Hillard W. Carey, Houston Natural Gas Co., has moved to Corpus Christi to head his firm's new district production and exploration offices. Also moving to the Corpus Christi office are **C. Andy Nees,** chief clerk, and **William H. Spencer,** geologist.

Robert L. Hoss, petroleum engineer for Humble Oil & Refining Co., Houston, was awarded the Alfred Nobel prize of the American Society of Civil Engineers at the seventy - seventh annual meeting of the American Institute of Mining and Metallurgical Engineers, held at San Francisco February 13-17. The award is given each year to the author of an outstanding technical paper on an engineering subject. Hoss was selected for the prize for his paper on "Calculated Effect of Pressure Maintenance of Oil Recovery." He is a former employe of Kewanee Oil Co., Tulsa, and obtained his master's degree in petroleum engineering from the University of Texas.

George S. Engle, Evansville, Ind., and **Bryan W. Newkirk,** Toronto, have formed Albercan Oil, Ltd., which plans to drill 50 wells in 1949 in the Illinois basin area.

Fred H. Billups, marketing adviser for Europe and North Africa, Standard Oil Co. (N. J.), has been appointed assistant marketing coordinator of the company. Other new appointments include: **George M. Parker,** marketing adviser for European and North African affiliates; **R. R. McCoy,** deputy adviser of that territory; **D. W. Ramsey,** marketing adviser, and **W. A. Greeven,** deputy adviser, Central and South America; and **William R. Maddux,** shareholders' representative for Germany.

George L. MacPherson, manager of engineering and development division, Imperial Oil, Ltd., has been named general manager of refineries for the company. A graduate of Toronto University, MacPherson joined

Imperial in 1923, specializing in designing of new equipment and plants, and became assistant chief engineer in 1935. In 1948 he was elected president of the Ontario branch, Association of Professional Engineers. **Dwight S. Simmons** has been named acting manager of the engineering and development division.

Tom McGlothlin, consulting geologist, has announced the opening of his offices in the Fuller Building, Laurel, Miss.

A U. S. Naval reserve petroleum unit has been established in Tulsa, with **Lt. Comdr. A. E. Hartin** in charge. The unit, made up of geologists, production, pipe line, refining and marketing men, will operate on a volunteer basis, with reserve officers and former enlisted navy personnel eligible for membership.

L. M. Crosfield, manager of Burmah Oil Co. (Pakistan Concessions), Ltd., Karachi, Pakistan, has retired after 28 years of service with Burmah Oil in the East. He had directed the company's operations in search for oil in Pakistan since the end of the war. Crosfield joined Burmah Oil in 1921.

Gail F. Goodrich has been named executive assistant, personnel, for Mene Grande Oil Co., S.A., succeeding **Don A. Bracken,** who was retired. Goodrich joined Mene Grande in 1939 as secretary to the president.

G. W. Horne, formerly president and general manager of Standard Oil Co. of Cuba, has been named to the management committee of Creole Petroleum Corp., Caracas, Venezuela. He will be responsible for marketing and marine departments and will serve as alternate representative for the industrial relations and refining departments. Horne joined the company in 1938, having formerly worked for Carter Oil Co., Jersey Standard affiliate.

Louis G. Wilke, Phillips Petroleum Co., Denver, has been appointed vice chairman of the Rocky Mountain oil industry information committee, according to **Paul Hirth,** Continental Oil Co., Denver, district chairman. Other members of the committee include: **L. L. Leabo,** Bay Petroleum Corp., Denver, Colorado chairman; **C. J. Westcott,** Westcott Oil Co., Boise, Idaho, chairman for Idaho; **Branson G. Stevenson,** Socony-Vacuum Oil Co., Great Falls, Mont., Montana chairman; **H. A. Wallace,** Utah Oil Refining Co., Salt Lake City, Utah chairman; and **E. T. Storey,** Standard Oil Co. (Ind.), Cheyenne, Wyo., chairman for Wyoming.

SHIFTS—

G. T. Richardson, engineer, Humble Oil & Refining Co., Mobile, Ala., to Pascagoula, Miss.; **John L. Robinson, Jr.,** geologist, Gulf Research & Development Co., Lovington, N. M., to Pittsburgh, Pa.; **John S. Floeter,** engineer, American Republics Corp., Silsbee to Houston.

Mark S. Patton, Jr., engineer, Sunray Oil Corp., Forsan to Alice, Tex.; **Henry W. Hinkle,** engineer, Stanolind Oil & Gas Co., Levelland to Lubbock, Tex.; **F. E. Melott,** geologist, Deep Rock Oil Corp., Wichita Falls to Midland, Tex.; **L. R. Arnold,** engineer, Sinclair Refining Co., Chicago to Delphi, Ind.; **R. L. Fedell,** engineer, Phillips Petroleum Co., Frontenac, Kans., to Smackover, Ark.

Charles M. Brecheisen, superintendent, Socony-Vacuum Oil Co., Inc., Topeka to Wichita, Kans.; **O. V. Henry,** superintendent, Ohio Oil Co., Grand Rapids, Mich., to Casper, Wyo.; **D. L. Province,** superintendent, Ohio Oil Co., Reed City to Grand Rapids, Mich.; **V. G. Feather,** geologist, Honolulu Oil Corp., Calgary, Canada, to Lubbock, Tex.

James E. Fuller, superintendent, Rocky Mountain Drilling Co., Compton to Santa Paula, Calif.; **C. R. La Rue,** engineer, Phillips Petroleum Co., Terminal, Tex., to Shidler, Okla.; **George W. McMurry, Jr.,** engineer, Sun Oil Co., Beaumont to Austin, Tex.; **Paul J. Latch,** foreman, The Texas Co., Denver City to Sundown, Tex.; **David Johnston,** engineer, Humble Oil & Refining Co., Houston to Corpus Christi, Tex.

Leslie Fisher, foreman, American Liberty Oil Co., Mt. Pleasant to Panola, Tex.; **John A. Cathey,** geologist, Seaboard Oil Co., Lafayette, La., to Midland, Tex.; **N. B. Frickman,** engineer, Humble Oil & Refining Co., New Iberia, to Franklin, La.; **C. M. Carothers,** engineer, Humble Oil & Refining Co., Mobile, Ala., to Westwego, La.; **L. P. Bristley, Jr.,** geologist, Gulf Research & Development Co., Monroeville, Ala., to Hazelhurst, Miss.

W. C. Ditchen, engineer, Interstate Oil Pipe Line Co., Mandeville to Texarkana, Ark.; **Harold G. Cramer,** engineer, Texas Empire Pipe Line Co., Yale to Cooksville, Illinois; **V. K. Benson,** geologist, The Texas Co., Alta, Iowa, to Snyder, Tex.; **Bruce L. Corey,** engineer, Socony-Vacuum Oil Co., Inc., White Eagle Pipe Line Division, Wichita to Topeka, Kans.; **H. B. Smyrl,** geologist, Petty Geophysical Engineering Co., Sonora to Kermit, Tex.

Carl Worsham, foreman, Mudge Oil Co., Graham to Haskell, Tex.; **C. K. Seaman, Jr.,** superintendent, Humble Oil & Refining Co., New Iberia, La., to Everglades, Fla.; **W. M. Parsons,** superintendent, Pure Oil Co., Casper, Wyo., to San Angelo, Tex.; **W. C. Sylvester,** engineer, Ohio Oil Co., Cody to Casper, Wyo.; **Harold G. Owen,** engineer, Continental Oil Co., Ponca City, Okla., to Denver, Colo.; **Edward W. Porter,** engineer, Phillips Petroleum Co., Shidler, Okla., to Borger, Tex.

DEATHS

Harry J. Saladin, 59, manager of the lubricating department, Standard Oil Co. (Ind.), died February 8 in Evanston, Ill.

John E. Fitzpatrick, 64, retired veteran gager for Stanolind Pipe Line Co., died February 3 in Tulsa.

Smith H. Lapsley, 51, engineer with Texas Pipe Line Co., Tulsa, died February 14 in Tulsa.

Ralph D. Risser, 56, former division superintendent, Shell Oil Co., Inc., died February 6 at Kilgore, Tex.

Tronson Draper, 70, for many years prominent in the Canadian oil industry, formerly with Royalite Oil Co., Calgary, died recently in Arizona.

Harry L. Mourer, 65, president of Crude Oil Corp. of America, died February 9 in Tulsa. At one time he served as president of the Kansas & Gulf Oil Corp.

Paul M. Brown, 48, veteran accounting department employe of Tide Water Associated Oil Co., died February 13 in Tulsa.

Albert James Squier, 75, Scranton, Pa., former president of Oil Trades Association of New York, died February 10 in Scranton.

John B. Jarrett, 55, Sand Springs, Okla., high pressure still foreman for Sinclair Refining Co., died February 14 in Sand Springs.

Leslie N. Shaw, 71, formerly with Alexander & Smith Oil Co., Houston, died February 10 in Fort Worth, Tex.

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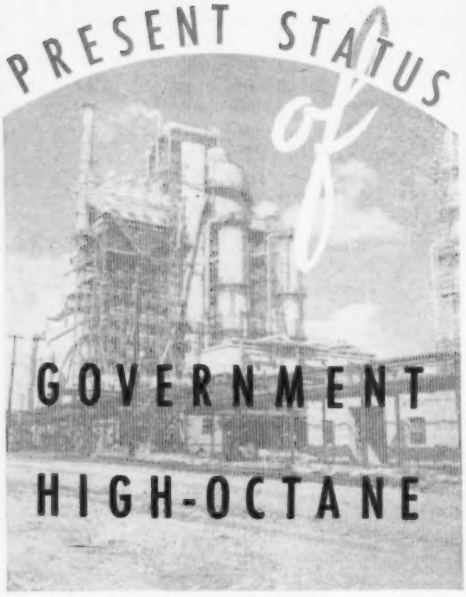
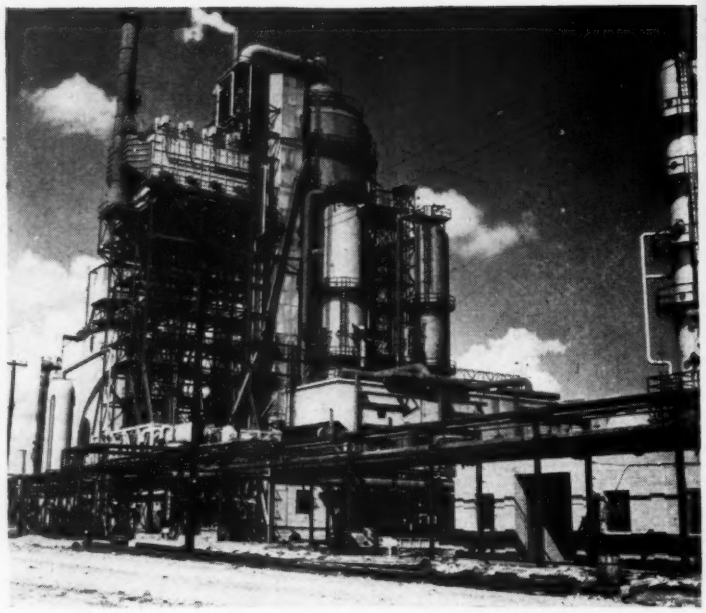




Aviation-Gasoline Plants

by George Walker* and Williard C. Cope*

DEVELOPMENT of the commercial production of petrochemicals has been greatly accelerated as a result of the wartime program for increased output of aviation-grade gasoline. Synthesized materials such as styrene, ethylene, a number of aromatic derivatives, and polymers are now obtainable at prices reflecting improved methods of operation under conditions of automatic continuous flow. The intermediate materials now available on a competitive basis contribute tremendously to the rapid expansion in output of consumer products now in use.

The war program entailed rapid expansion of output of aviation gasoline from an existing 40,000 bbl. daily to 556,000, an enormous increase, the accomplishment of which necessitated direct application, for production purposes, of knowledge still in the primary experimental stages. Translation of this type would be economically prohibited under normal industrial conditions. The investment for expansion of facilities was over $700,000,000. The direct government expenditure was some $230,000,000, and the remainder of the investment was made by private industry under conditions of accelerated amortization privilege enabling relatively rapid writeoff of the extraordinary costs.

Well before the ending of actual hostilities, study was commenced with respect to the peacetime requirements for aviation gasoline as such for continuing national defense, and for the expanding requirements of world-wide air transportation. Consideration was also given to the utilization of the facilities for production of gasoline of the so-called premium grade of higher octane number, in view of the trend toward higher compression ratio required by the engines under development for ground transportation and stationary power.

These studies indicated that it appeared reasonable to forecast that gasoline used in aviation which had been 30,000 bbl. per day in 1941, would be 100,000 bbl. in 1948, and increase to 200,000 bbl. per day by 1960. At the same time it was forecast that gasoline consumption, for all purposes other than aviation, which had been 1,800,000 bbl. daily in 1941, would expand to 2,000,000 bbl. by 1949, and to 2,500,000 bbl. daily by 1960.

Although complete consumption figures for 1948 are not available, the indication is that the forecast was reasonably correct, and on this basis it may be concluded that the consumption of gasoline for aviation is about 20 per cent of the wartime production of 550,000 bbl. daily, and about 5 per cent of the gasoline used for all other purposes. Acceptance of the forecast for 1960 would imply that this 5 per cent figure would increase to about 8 per cent.

*War Assets Administration, Washington.

Disposal of Government Plants

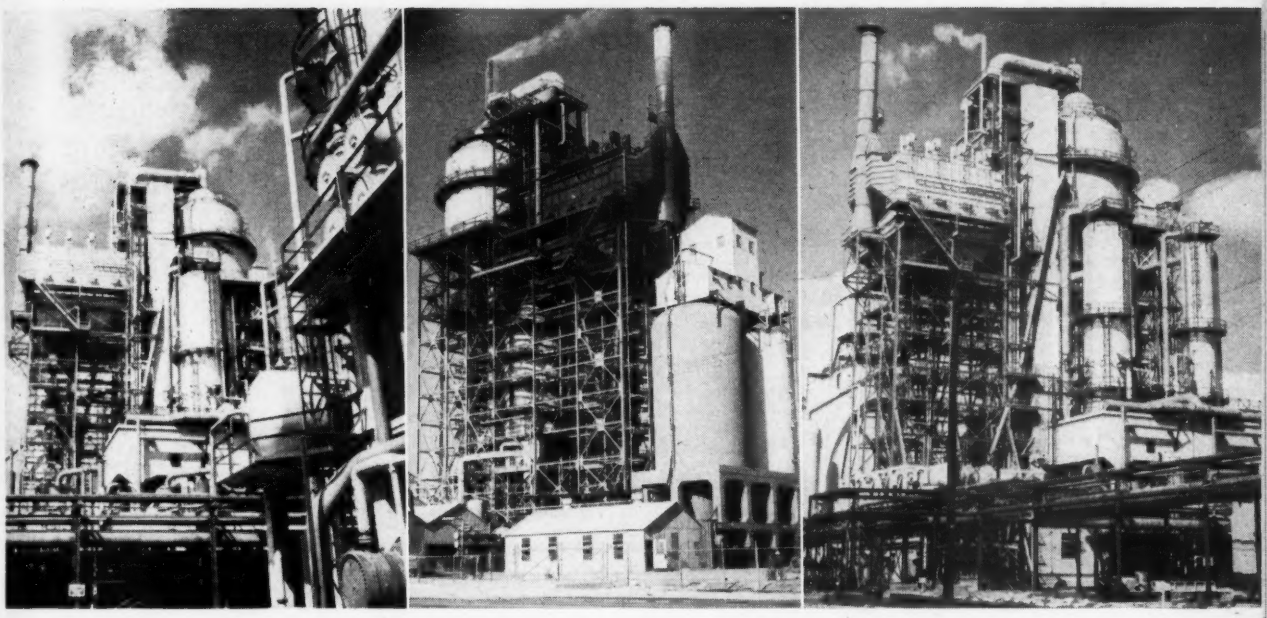
All but a few of the 29 government-built aviation-gasoline facilities have been disposed of to private industry, and all of the cat cracking units are reported in full operation, together with those erected by the various petroleum refining companies. Therefore, it may be considered that the bulk of the wartime production of high-octane constituent is finding outlet as premium motor fuels.

Installations in Eastern Area

Only two plants, Plancor 1044, Pennzoil Co., Oil City, Pa., and Plancor 1067, Ashland Oil & Refining Co., Catlettsburg, Ky., were built for wartime production of aviation gasoline in the eastern area of the United States.

Plancor 1044, Pennzoil Co., Oil City, Pa.—The Petroleum Administration for War negotiated with this company for the construction and operation of an alkylation unit to be operated in conjunction with the privately owned facilities of several plants through a cooperative agreement in which Pennzoil had a 59.0 per cent interest; James B. Berry Sons Co., 22.4 per cent; Wolf's Head Oil Refining Co., 13.0 per cent, and Continental Refining Co., 5.6 per cent. The project was placed in operation in May 1944, and produced at the rate of 40,000 bbl. monthly and was closed down September 1945.

The plant was designed to process 2,000 bbl. per day of 400° F. e.p. catalytic gasoline and lighter hydrocarbons, and 4,000,000



Shown on these pages are some of the war-built plants which have been converted to peacetime production

ALL BUT FEW OF 29 WARTIME FACILITIES HAVE BEEN DISPOSED OF TO PRIVATE INDUSTRY

cu. ft. per day of butanes and lighter hydrocarbons in a gas-concentration unit to produce 1,100 bbl. per day of a mixture of butanes and butenes. The butanes—butenes were charged to the HF alkylation unit to produce 556 bbl. per day of rerun alkylate which was combined with 680 bbl. per day of base stock and pentanes from the gas-concentration unit to produce 100-octane gasoline.

Of all aviation gasoline plants built by the Government, Plancor 1044 had the least advantageous economic location due to the fact that it was dependent on Pennsylvania crude which is valued primarily for its lubricating-oil yield. Also this crude is in short supply and only 50,000 bbl. per day are currently being produced. For this reason, the outlook for disposal based on use in place for its designed purpose was not too promising. However, Koppers Co. had use for a plant for chemical manufacture and could use certain parts of the equipment, notably distillation columns, power house, tankage, and general facilities.

Plancor 1044 was sold to Koppers Co. for $1,230,000, the approximate fair value, based on the degree of Koppers Co. utilization. It was the only aviation-gasoline plant sold for use other than for processing petroleum products.

Plancor 1067, Ashland Oil & Refining Co., Catlettsburg, Ky.—Located on the Big Sandy River, adjoining the Ashland refinery with which it is connected by pipe lines. The plancor consists of a 10,000-bbl.-per-day T.C.C. gas-oil cracking unit, T.C.C. treating unit, gas-concentration unit, 3,000-bbl.-per-day alkylation unit, 1,300-bbl.-per-day butane isomerization unit, and general facilities. The plant was lacking crude topping and thermal cracking units, but these facilities were available in the No. 1 Ashland plant.

Broad cut gas oil was delivered to the T.C.C. unit from which gasoline, butanes, butenes, No. 2 fuel oil, heavy cycle gas oil, gas, and coke were resulting products. Heavy cycle gas oil was further processed by thermal cracking to gasoline, butanes, butenes, bunker C fuel oil, and dry gas. Aviation gasoline was produced by the general process, utilizing gas concentration, alkylation, isomerization, and blending. The designed output was 3,840 bbl. of 100-octane gasoline per calendar day, but the plancor had a demonstrated capacity of 5,300 bbl. per day.

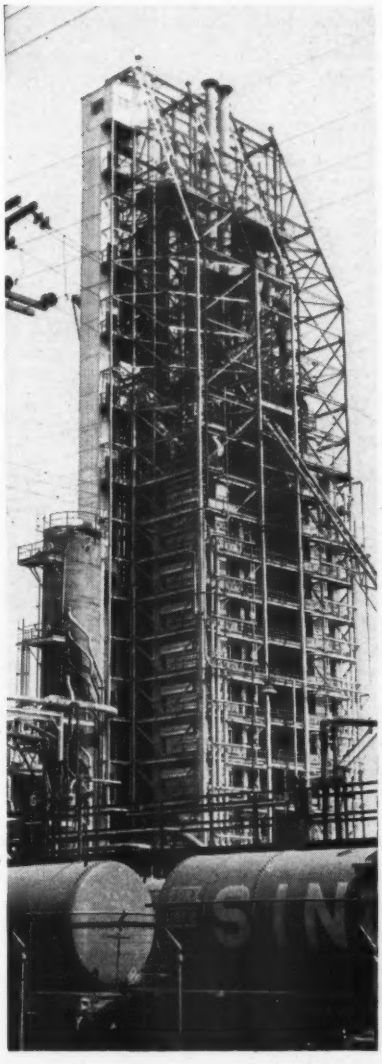
The plancor went on stream in July 1944, operated during the war period, and was later leased to Ashland for partial use in place. It was sold to Ashland Oil & Refining Co. for $2,153,000. The Ashland plant operates predominately on Illinois crude oil.

Mid-Continent and Mountain Area

This group consists of seven plants, of which two were minor special-purpose installations and five were 100-octane aviation-gasoline plants. The five larger plants operated in conjunction with privately owned refineries from which charging stocks were obtained for processing into aviation gasoline.

Plancor 1036, Anderson-Prichard Refining Corp., Cyril, Okla.—Plant comprised facilities that were commingled with the privately owned property of this corporation. The facilities located on leased land consisted primarily of two fractionating towers for feed recovery and depropanizing together with necessary auxiliaries, a compressor plant, cooling tower, and two high-pressure storage spheres.

Operation consisted of removal of the maximum amount of butane and butenes from the pressure distillate and vent gases. The depropanizer column in the private refinery stripped the pressure distillate charge stock of its propane, butane, and butenes, and the resultant product was then condensed under pressure in the plancor equipment. Fuel gases were compressed and cooled in the feed recovery tower and other plancor equipment to yield a similar volatile liquid. The component liquid stream of the two operations was then purified by fractionation in the plancor depropanizer tower. The resultant propane, butane, and butenes were then shipped by tank car to



GOVERNMENT 100-OCTANE AVIATION-GASOLINE PLANTS—DATA AND DISPOSITION

Plancor No.	Name and location—	Actual cost	Depreciated value	Fair value	Sales price	Purchaser	Designed capacity (B/D)			100-octane gasoline (B/D)
							Catalytic cracking	Alkylation	Butane isomerization	
	EASTERN									
1067	Ashland Oil & Ref. Co., Catlettsburg, Ky.	$15,802,000	$7,921,000	$2,670,000	$2,153,000	Ashland O. & R.	10,000	3,000	1,300	5,300
1044	Pennzoil Co., Oil City, Pa.	4,076,000	2,714,000	1,210,000	1,230,000	Koppers Co.		1,500		1,600
	MID-CONTINENT-MOUNTAIN									
1036	Anderson-Prichard Ref. Corp., Cyril, Okla.	242,000	228,000	122,000	83,000	Anderson-Prichard				
1059	Associated Refineries, Inc., Beckett, Okla.	14,418,000	9,299,000	2,588,000	5,100,000	Sunray Oil Co.	10,000	2,200	250	5,100
1229	Bay Petroleum Corp., Denver	126,000	97,000	46,000	46,000	Bay Pet. Corp.				
1042	Continental Oil Co., Ponca City, Okla.	16,799,000	7,689,000	3,943,000	3,125,000	Continental Oil	20,000	3,000	1,500	6,000
959	Cooperative Ref. Co., Coffeyville, Kans.	6,084,000	2,987,000	1,375,000	1,200,000	Cooperative Ref.	3,800	1,000	400	1,640
1146	Frontier Ref. Co., Cheyenne, Wyo.	7,562,000	5,213,000	1,256,000	1,242,000	Frontier Ref.	2,700	1,100	450	1,700
1164	Utah Oil & Ref. Co., Salt Lake City	15,221,000	9,099,000	4,148,000	4,148,000	Utah Oil & Ref.	8,500	3,000	1,000	7,000
	TEXAS-LOUISIANA-ARKANSAS									
880	J. S. Abercrombie and Harrison Oil Co., Sweeney, Tex.	27,850,000	14,073,000	13,911,000	13,100,000	Alamo Ref.	13,000	4,000	1,500	8,500
1068	Crown Central Pet. Corp., Pasadena, Tex.	16,010,000	11,132,000	2,496,000	2,300,000	Crown Central	10,000	3,500	1,300	3,900
911	Eastern States Pet. Co., Houston	11,365,000	4,554,000	1,797,000	2,000,000	Eastern States	5,000	1,600	600	2,640
638	Great Southern Corp., Corpus Christi, Tex.	11,012,000	5,424,000			Not sold		1,500		5,270
1871	Pan American Pet. & Transport Co., Texas City, Tex.	2,832,000	1,719,000	443,000	412,000	Pan American Pet. & Transport				
592	Premier Oil Refining Co., Cotton Valley, La.	7,019,000	4,980,000	2,100,000		Not sold		2,200		2,130
562	Pure Oil Co., Smiths Bluff, Tex.	3,410,000	2,015,000	855,000	630,000	Pure Oil Co.		1,330		1,440
718	Republic Oil & Refining Co., Texas City, Tex.	10,031,000	5,475,000	2,543,000	2,300,000	Republic O. & R.	12,000	1,800		3,600
689	Root Petroleum Co., El Dorado, Ark.	6,278,000	2,546,000	1,396,000	1,100,000	Root Pet. Co.	4,600	1,300	250	1,630
591	Southport Petroleum Co., Texas City, Tex.	11,071,000	7,373,000	3,700,000	3,250,000	Petrol Terminal	13,000	1,600		3,000
1868	Esso Standard Oil Co. of New Jersey, Baton Rouge	2,779,000	1,458,000	599,000		Not sold				
	CALIFORNIA									
1041	Mohawk Petroleum Corp., Bakersfield, Calif.	4,507,000	2,886,000	1,924,000		Leased to Standard of Calif.	1,000	450		2,160
1833	Standard Oil of California, Richmond, Calif.	21,215,000	13,795,000	5,340,000	6,000,000	Standard Oil of Calif.	14,000	3,200	1,400	20,000
912	Wilshire Oil Co., Inc., Norwalk, Calif.	8,305,000	4,597,000	1,322,000		Not sold	4,000	1,750	1,000	4,700

another refinery to be used as components for 100-octane aviation gasoline.

These facilities were sold to Anderson-Prichard for $83,000 for conversion to other than designed use. Usually, the cost of conversion and inefficiency of using equipment not specifically designed for the purpose, reduces the value of this type of equipment close to salvage.

Plancor 1229, Bay Petroleum Corp., Denver.—Comprised facilities to remove the fraction containing butanes and butenes from cracked gasoline or pressure distillate produced in the No. 1 plant of Bay Petroleum Corp. The plancor produced approximately 126 bbl. per calendar day of product which was shipped to another refinery for use as a component of aviation gasoline. Facilities consist of a gas-concentration unit of two towers, namely, debutanizer and depropanizer, plus auxiliaries and high-pressure storage tanks.

The plancor was sold to Bay Petroleum Corp., the logical purchaser, for $46,000 for use in place.

Plancor 1059, Associated Refineries, Inc., Beckett, Okla.—Comprised a two-stage catalytic cracker and other facilities to produce 100-octane aviation gasoline. During the war, the cat cracker was supplied with virgin gas-oil charge by eight refineries located within reasonable proximity to the plant. With the exception of Rock Island Refining Co., which had a pipe line, all member refining companies delivered gas oil to the plancor by truck and took back cracked gas oil.

The plant had a 10,000-bbl.-per-day fluid catalytic cracking unit, a 2,000-bbl.-per-day alkylation unit, a 200-bbl.-per-day butane isomerization unit, a boiler plant, and necessary tankage, blending facilities, and utilities. The plancor lacked only a crude-distillation unit for independent manufacture of gasoline and fuel oils.

The plancor went into full operation June 1944, was shut down August 1945, and was taken over by Defense Plant Corp., a subsidiary of Reconstruction Finance Corp., April 28, 1946. The design output of the plant is 4,200 bbl. per day of 100-octane gasoline, although actual production during wartime operations averaged approximately 5,100 bbl. per day.

The property was sold to Sunray Oil Corp., for $5,100,000, and shortly thereafter Sunray announced plans to build distillation facilities and to link the plant with its present refinery at Allen, Okla., with a 93-mile, 6-in. pipe line.

Plancor 1042, Continental Oil Co., Ponca City, Okla.—Consists of a 20,000-bbl.-per-day T.C.C. gas-oil cracking unit (including gas concentration); T.C.C. treating unit; a 3,000-bbl.-per-day alkylation unit; 1,500-bbl.-per-day butane isomerization plant; boiler plant, tankage, and general facilities. The plant was operated during the war to produce T.C.C. aviation base stock and alkylate from gas oil supplied by the Continental No. 1 refinery. The rated capacity of the facilities was 4,520 bbl. per day of 100-octane gasoline with actual operating capacity of 6,000 bbl. per day.

As operated during the war, products from both the privately owned plant and the plancor comprising products from the crude topping unit, T.C.C. unit, thermal cracking unit, plus the alkylate and butane fraction from the alkylation unit were

blended and leaded with tetraethyl lead to the proper octane number.

This property was sold to Continental Oil Co. for $3,125,000.

Plancor 959, Cooperative Refining Co., Coffeyville, Kans.—Consists of a 3,800-bbl.-per-day fluid catalytic cracker (including gas-concentration plant); 1,000-bbl.-per-day HF alkylation unit; 400-bbl.-per-day isomerization unit, and general facilities. The private Cooperative refinery has crude topping, thermal cracking, lube, and other facilities for processing 12,000 bbl. per day of crude oil.

Aviation gasoline was produced during wartime from gas-oil charging stock from the No. 1 refinery, utilizing the plancor equipment and general method of operation. Since the war, this plant has been sold to Cooperative Refining Co., which has adapted the plancor isomerization unit to a catalytic polymerization unit. This company has apparently been able to meet current octane requirements for motor fuel by this and other readaptations.

This property was sold for $1,200,000.

Plancor 1146, Frontier Refining Co., Cheyenne, Wyo.—Consisted of a 2,200-bbl.-per-day crude-distillation unit; a 1,500-bbl.-per-day thermal reforming unit; a 2,700-bbl.-per-day single-stage fluid catalytic cracking unit with gas concentration, a 1,100,-bbl.-per-day alkylation unit; a 450-bbl.-per-day isomerization unit, and general facilities. This plancor was one of two government plants that had a crude distillation unit; all others being dependent for these facilities upon the privately owned plants. The plant had a small capacity and operated on Rocky Mountain crude oil.

The property was sold to Frontier for $1,242,000. Since that time, the company has readapted the isomerization unit to a catalytic polymerization unit, and has made other changes in order to produce motor fuel.

Plancor 1164, Utah Oil & Refining Co., Salt Lake City.—Comprised a fluid catalytic cracking and gas-concentration unit, with 8,500-bbl.-per-day gas-oil charge capacity; sulfuric acid alkylation unit of 3,000 bbl. per day alkylate; butane isomerization, naphtha isomerization, naphtha fractionation, and general facilities. The plant was not well located with respect to alkylation as the crude-oil supply for this property does not contain casing-head gas or butane and the cost of shipping butane from Wyoming, California, and Oklahoma was expensive. However, during the war, supplies were considered more important than the cost and accordingly the major portion of the alkylation feed was obtained from outside sources. In order to recover the values in gases processed in the alkylation unit, it would be more desirable to install a catalytic polymerization unit.

During wartime operation, the plant had a capacity of 5,000 bbl. per day of 100-octane gasoline, but 7,000 bbl. per day could be blended with a supply of high-octane base stock from outside sources. The plancor was purchased by Utah Oil Refining Co., in May 1946, for $4,148,300, and is now being used for production of motor gasoline and other products required in our peacetime economy. It is one of two government plants designed for alkylation with sulfuric acid; all others using HF alkylation.

Texas, Louisiana, Arkansas Area

This area comprises 11 plants for production of 100-octane aviation gasoline or components that could be used for augmenting aviation-gasoline supply. Plancor 638, Great Southern Corp.; Plancor 592, Premier Oil Refining Co., and Plancor 1868, Esso Standard Oil Co., Baton Rouge, were special-purpose plants designed for hydrogenation or dehydrogenation. Plancor 1871, Pan American Petroleum & Transfer Co., was built to produce isopentane from pentane by catalytic isomerization. The seven remaining plants in this area were designed to produce 100-octane aviation gasoline in conjunction with privately owned refineries with the exception of Plancor 880, J. S. Abercrombie & Harrison Oil Co., which was a completely integrated refinery.

Plancor 638, Great Southern Corp., Corpus Christi, Tex.—Comprised prefractionation, reforming, dehydrogenation, HF alkylation, and general facilities. Pontiac Refining Co. furnished naphtha charge stock and four nearby recycling plants furnished butane-isobutane stock. During wartime operation, production averaged 5,270 bbl. per day of 100-octane gasoline made up of products from its own plant and various blending stocks from outside sources.

For operation, butane was dehydrogenated to butylenes which were alkylated with isobutane to produce alkylate for aviation gasoline. Later, butylenes were concentrated to about 85 per cent purity in a mixture of butanes and sold to Humble Oil & Refining Co., Baytown, Tex., for further processing to butadiene. Isobutylene was also produced for butyl-rubber manufacture.

This plant has been sold but has a potential value for use in petrochemical operations.

Plancor 592, Premier Oil Refining Co., Cotton Valley, La.—Was similar to Plancor 638, mentioned above, but after completion in February 1944 the original plan of blending alkylate with base stock obtained from the adjacent refinery to produce aviation gasoline was changed to shipment of straight alkylate to other refineries for blending into 100-octane gasoline. In August 1946 the plancor was taken over by Rubber Reserve and the facilities converted to production of butylene concentrate (containing butylenes and butadienes) which was shipped to Port Neches and Baytown, Tex., and Baton Rouge for the rubber program.

The plancor has not been sold, but like Plancor 638, has possibilities for adaptation to the newer techniques of petrochemistry.

Plancor 1868, Esso Standard Oil Co., Baton Rouge.—Involved an expansion of Esso's existing hydrogenation facilities for hydrogenation of polymer, catalytic naphtha, and the like, to make aviation-gasoline blending components. Later, the project was expanded to provide facilities for production of xylidines (CS) by hydrogenation of a material made elsewhere. CS was considered at the time to be of great importance as a superior blending agent for increasing the rich mixture performance of 100-octane gasoline.

The plancor was a scrambled facility entirely dependent on the wartime lessee's feed stocks, maintenance facilities, and office space. It contains relatively new standard process equipment, such as pumps, heat exchangers, pressure vessels, pipe, valves, fittings, and instruments. Also high-pressure hydrogen compressors, CO_2 scrubbing unit, and cooling tower.

The plant produced 19,000,000 cu. ft. per day of hydrogen which is sufficient to produce 200 daily tons of ammonia in case such utilization was contemplated. Three oil companies, Shell Oil Co., Inc., Lion Oil Co., and Phillips Petroleum Co. are engaged in ammonia manufacture and do not find it incompatible with petroleum-refining operations. This plancor has not been sold, but the fair value of the property is $599,000 based on a utilization that is tantamount to a removal value because of readaptation necessary for other than designed use.

Plancor 1871, Pan American Petroleum & Transport Co., Texas City, Tex.—Was built to produce isopentane from normal pentane by catalytic isomerization and to produce isopentane from an adjoining alkylation plant product by fractionation. Normal pentane is a poor blending component for 100-octane gasoline while isopentane of tethaethyl lead being 62 for n-pentane and 90 for isopentane.

The facilities comprise an isomerization unit, boiler plant, isopentane storage, spheroids, feed-stock storage, offsite facilities, and general property. Peacetime use will probably be production of petroleum chemicals, as Pan American announced some time ago the establishment of petrochemical department with production and research headquarters at Texas City.

This plancor was sold to Pan American in the fall of 1947 for $411,500.

Plancor 880, J. S. Abercrombie and Harrison Oil Co., Sweeney, Tex.—This is a complete 100-octane aviation gasoline refinery with river and ocean-terminal facilities; the barge terminal being located on San Bernard River, and the deep-water terminal on the outskirts of Freeport, Tex., some 28 miles southeast of the refinery. It was the most expensive government-built and operated refinery with a capacity of 8,500 bbl. per day of aviation gasoline, together with military motor fuels and a considerable volume of industrial fuel oil. The facilities comprise 23,000 bbl. per day of crude distillation, thermal reforming, fluid catalytic cracking, gas concentration, HF alkylation, isomerization, treating, blending, and general facilities.

This plancor cost $27,850,000, and was sold to Alamo Refining Co., in which Phillips Petroleum Co. has a substantial interest, for $13,100,000.

Plancor 1068, Crown Central Petroleum Corp., Pasadena, Tex.—Plant was designed for production of aviation gasoline by thermofor catalytic cracking in conjunction with the private plant of Crown Central. Gas-oil charging stock was supplied by pipe line from the private refinery, together with 400 bbl. per day of raw butanes and butylenes (B-B) from the thermal cracking unit. The designed production was 2,293 bbl. per day of depentanized base stock, 1,540 bbl. per day debutanized alkylate, 850 bbl. per day isobutane, 430 bbl. per day of normal butylenes in B-B stream for synthetic-rubber production and by-products of tar, fuel, and furnace oil. Lessee stated that production reached designed capacity.

In addition to the thermofor catalytic cracking unit, the plant had HF alkylation, butane isomerization, boiler plant, utilities, and other facilities.

Crown Central purchased this plant in 1947 for $2,300,000 on the reported basis of catalytic cracking capacity as insurance against possibility of increased octane quality of motor-grade gasoline or readaptation of the alkylation and isomerization units for other than designed purposes. The thermofor catalytic cracker is reported as efficient in processing sour crudes of western Texas, in place of sweet crudes available at Houston. Approximately 70 per cent of the contained 2.0 per cent sulfur in West Texas crude is removed as H_2S in the off gases in this process.

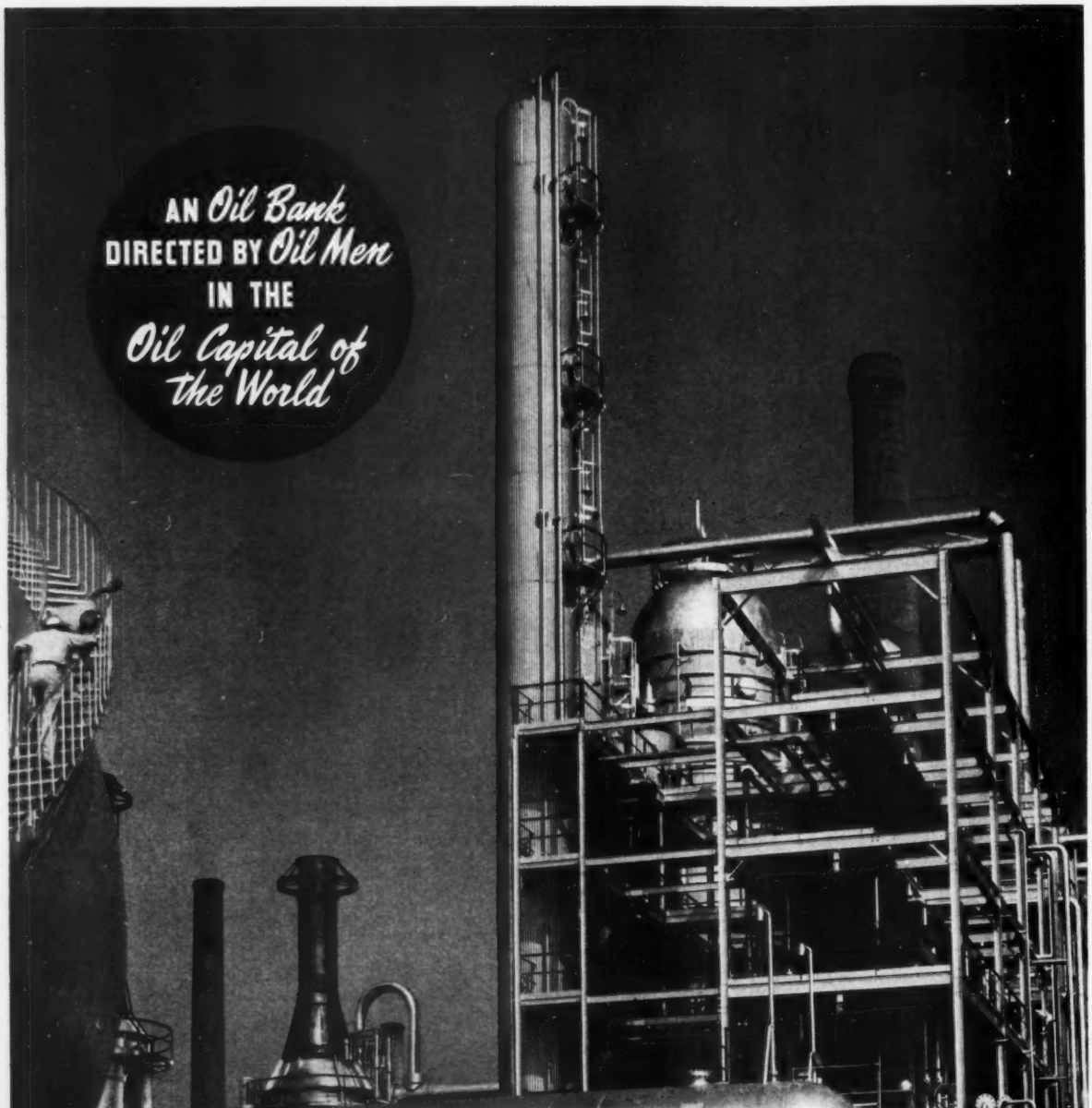
Plancor 911, Eastern States Petroleum Co., Pasadena, Tex.—Comprises a fluid catalytic unit of 5,000 bbl. per day virgin gas-oil capacity, 1,600 bbl. per day butane isomerization. Gas oil was supplied by Eastern States' private plant. It was not a complete refinery, as it is lacking a crude-topping unit, a thermal cracking unit, and auxiliary equipment.

For peacetime use the value of the plant was estimated on full capacity operation of F.C.C. and the necessary portion of gas-concentration unit; limited use of boiler plant, buildings, tankage, and certain other facilities and salvage value of alkylation unit and isomerization unit and other excess salvable items.

The plant was sold in 1947 to Eastern States for $2,000,000, who contemplated capital expenditure of $400,000 for readaptation for commercial production of motor gasoline.

Plancor 562, Pure Oil Co., Smiths Bluff, Tex.—Consists of a 1,330-bbl.-per-day sulfuric acid alkylation unit with necessary feed-preparation facilities. Auxiliary facilities include boilers, tankage, water system, cooling tower, power, and light facilities.

(Continued on page 124)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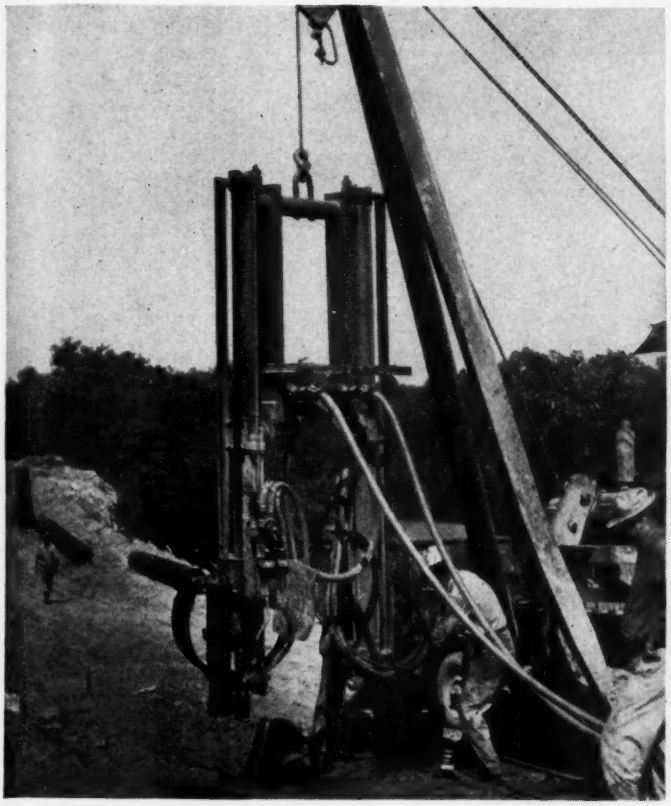

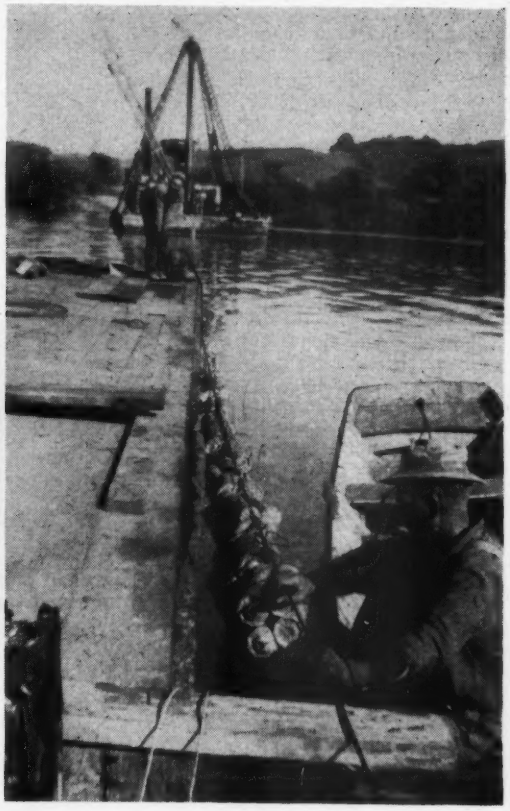

Left: Tandem wagon drills expedite shot-hole drilling. Right: Stringing dynamite while getting ready for a 2,000-ft. shot by the Primacord method at the Kanawha River crossing

ROUGH ROUTE TRAVERSED BY 24-IN. T. G. T. LOOP IN WEST VIRGINIA

by Paul Reed

THE first pipe for gas transmission in West Virginia with diameter as large as 24 in. was laid across one of the roughest routes traversed in pipe-line construction during the past year. The undertaking consisted of an 85-mile, 24-in. line with two major river crossings for Tennessee Gas Transmission Co., which was contracted by Oklahoma Contracting Co. Information for this article regarding measures applied to rough-country construction was furnished by Paul H. Halbert, who was in charge of operations for the contractor.

In utilizing advanced types of modern mechanical equipment, Oklahoma Contracting Co. demonstrated their effectiveness in mountainous country. This was particularly true in bending and doping operations. The route of this new loop extended for the most part along the tops of a series of ridges which were 3 to 5 miles from the original 20-in. line of T.G.T. laid in 1944. The policy of laying across the tops of ridges in this West Virginia country has been found to be preferable to that of cutting more expensive right-of-way on the ridge sides involving additional risks from rolling rocks, slips, and such hazards.

Even with the advantages afforded by the ridge-top route, much extra work was frequently required for removal of fences and for cutting down ridges to provide for a minimum working width of 30 ft. Because of the local custom of running fences along ridge tops, it was a common experience of the contractor to remove fences for distances of as much as a mile. To facilitate replacement of these fences, power-operated post-hole diggers were utilized. Ridges were cut down by bulldozers sometimes for stretches 1,000 ft. long. In places they were cut down a depth of 25 ft. Furthermore, for delivering pipe and supplies to the right-of-way in wooded areas, the contractor built approximately 50 temporary roads known as "shoo fly" roads.

The work was organized so that two spreads started from the Kanawha River; one of these spreads went eastward over the roughest part of the route which was rough all the way; the other went westward, first over 20 miles of fairly rolling open country to rough terrain beyond. A third spread laid the crossings at the Kanawha and Big Sandy rivers.

XUM

The gangs began laying pipe July 3 and made the final tiein October 15; cleanup was completed October 31.

The prevailing method followed was stovepiping. However, at several steep grades pipe was laid by first welding a four or five-joint section on top of the ridge which was carried by boom tractors moving downhill. In such cases it was frequently necessary to have each tractor winched by two other tractors firmly placed at upgrade positions. Jeeps and trucks with four-wheel drives were extensively used throughout the project.

Mechanical equipment was largely used in clearing right-of-way. Each right-of-way gang had six power saws of both chain and circular type. The circular saw was for the larger trees while the chain saws are more conveniently moved for cutting smaller trees. Brush and the smallest trees were cleared by the usual bulldozer methods.

Ditching and Rock Work

The large amount of rock work in connection with ditching for the project is indicated by the use of as many as 12 back hoes for the two main line spreads. Some of these were transferred back and forth so that sometimes the eastern spread had up to nine back hoes while the western gang at other times had six. Each back hoe was aided by a tow tractor in moving over steep grades.

Wagon drills which drill two holes simultaneously speeded up preparations for shooting. The wagon drill has an advantage over jack-hammer drills not only in their double feature but also in the fact that they would drill 2-in. instead of 1¾-in. holes to 8 ft. depth in one operation, not requiring the usual change of drills at 2 and 3-ft. intervals. The three sets of wagon drills on the project were each served by 500-ft. air compressors. At certain points on the overland route, 2,000 lineal feet of ditch was shot at one time.

For the rough eastern section there was one ditcher, for the western section two. Ditch was dug 42 in. wide and deep enough for the usual 2 ft. of cover. Much more hand labor was required than customary for pipeline construction.

River Crossings

The Kanawha River is 35 ft. deep from bank to bank where the river crossing was constructed. A ditch several feet deep was dug by clam shell through sand and gravel to solid rock, consisting of soapstone. To deepen the ditch further, the rock was blasted by dynamite strung on a steel cable. The dynamite was shot off by means of Primacord, which being an explosive itself is entirely consumed in the shooting operation. A 600-ft. shot consisting of 18,000 lb. of dynamite in 12-lb. sticks was followed by two spot shots to get desired depth at certain spots. Results of shooting were inspected by a diver.

The two lower tractors on the steep right-of-way on the opposite hill are winched by the third tractor, just above, as they go down while moving a section pipe

After shooting, the ditch was excavated to depths of 3 to 4 ft. by clam shell mounted on a barge. Total depth of the ditch was approximately 7 ft.

River-crossing pipe had ½-in. wall protected by double coating and wrapping. The Big Sandy River crossing was made by the usual dredging methods since the river bed was sand and gravel to the scour depth at which the pipe was laid.

Road Crossings

Most road crossings were bored by a power-driven auger developed by the Oklahoma Contracting organization. This proved to be faster and cheaper than hand-auger operations. Road crossings averaged more than one per mile.

Tunneling was done under a railroad through a 28-in. casing by shifts working through a 24-hour day. Each shift had two men in the tunnel and two outside. Dirt was moved out on a sled pulled through the casing.

An average of two to three pipe lines per mile were crossed along the project route. At such crossings the usual method was used for first laying the line and then cutting and fitting the pipe under the lines which were crossed.

Bending

A great number of bends of all sizes were made on the project. Cold wrinkle bending with C.R.C. machine was used throughout the project with

(Continued on page 130)

Tack-welding 24-in. pipe supported on cribbing at side of ditch

ELEMENTAL

Sulfur from Petroleum Gases

by R. A. Graff*

WITH the ever-increasing trend in the oil and gas industry toward the conservation of natural resources, considerable interest is currently being evidenced towards the recovery of elemental sulfur from byproduct hydrogen sulfide as extracted from natural or refinery gases during the normal course of gas-purification operations.

As early as 1941, serious interest was shown in this phase of the industry and, in the spring of 1942, experimental plants for the semicommercial production of sulfur were placed in operation by Susearch Corp., an affiliate of Texas Gulf Sulfur Co., at McKamie Ark., and by Southern Acid & Sulfur Co. at Magnolia, Ark. These installations were made following the discovery of appreciable sour gas reserves in southern Arkansas. The experience gained in the operation of these semicommercial plants resulted in the construction of two sizable units by Southern Acid & Sulfur Co. at McKamie and Macedonia, Ark., with a reported total capacity for both plants of approximately 140 short tons per day.

*Graff Engineering & Equipment Co., Dallas.

Several New Projects

Texas Gulf Sulfur Co., in conjunction with Pure Oil Co., is currently engaged in planning the construction of a sizable installation at Worland, Wyo. Natural gas being produced near this locality contains as high as 38 per cent by volume of hydrogen sulfide, along with a small percentage of carbon dioxide.

An additional 50-ton-per-day plant to be operated by Hancock Chemical Corp. is reported to be soon placed in operation near Watson, Calif., and this plant will utilize hydrogen sulfide as recovered from refinery gases processed at several of the refineries in that area.

It has also been reported that a sulfur recovery unit will be installed to process byproduct hydrogen sulfide from Poza Rica field in Mexico, and recovered sulfur will be transported to Mexico City for use in the production of fertilizer.

A similar installation is planned to process byproduct hydrogen sulfide from Elk Basin field in Wyoming. Natural gas from this field contains approximately 20 per cent hydrogen sulfide and Stanolind Oil & Gas Co. is the sponsor of the project.

The extremely stable market for sulfur assists in making the economics of sulfur recovery an attractive business venture, and several other companies are now considering the manufacture of this commodity from waste gases now being burned or vented to the atmosphere.

The cost of operation for an elemental sulfur-recovery plant to produce 50 tons per day of elemental sulfur is approximately $6 per short ton,

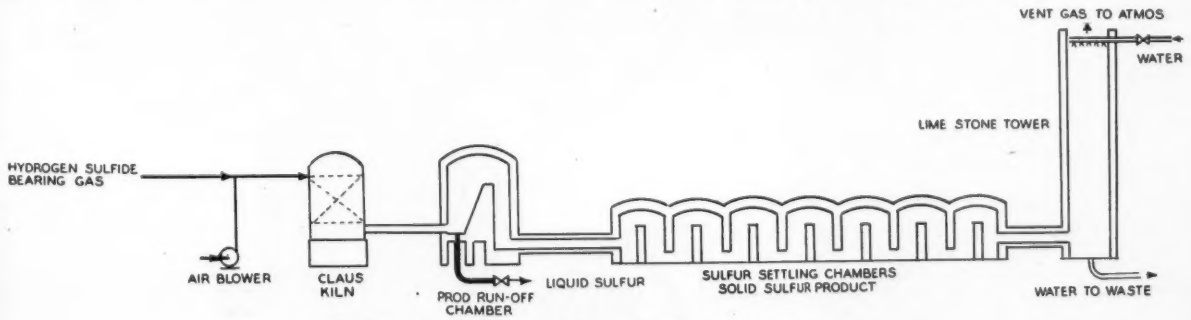

Fig. 1—Early Claus process for production of elemental sulfur

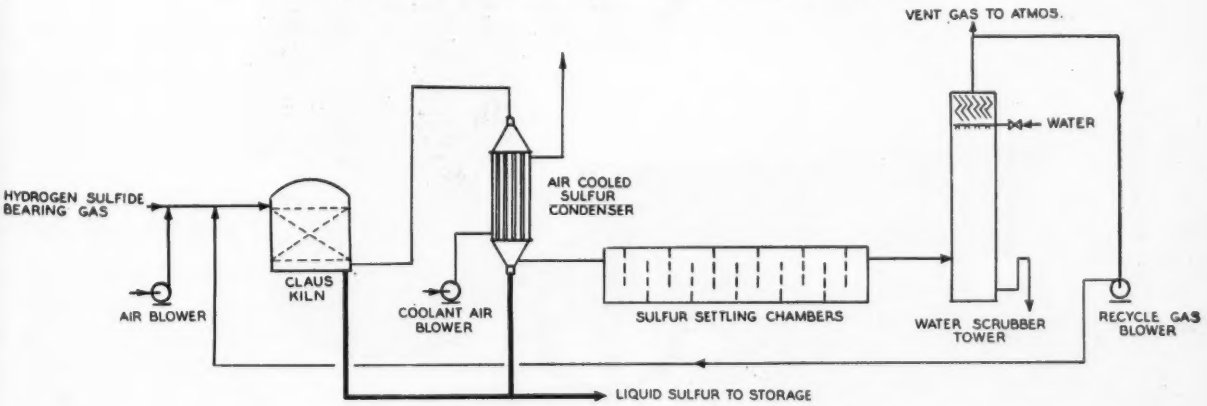

Fig. 2—Modified Claus process for production of elemental sulfur

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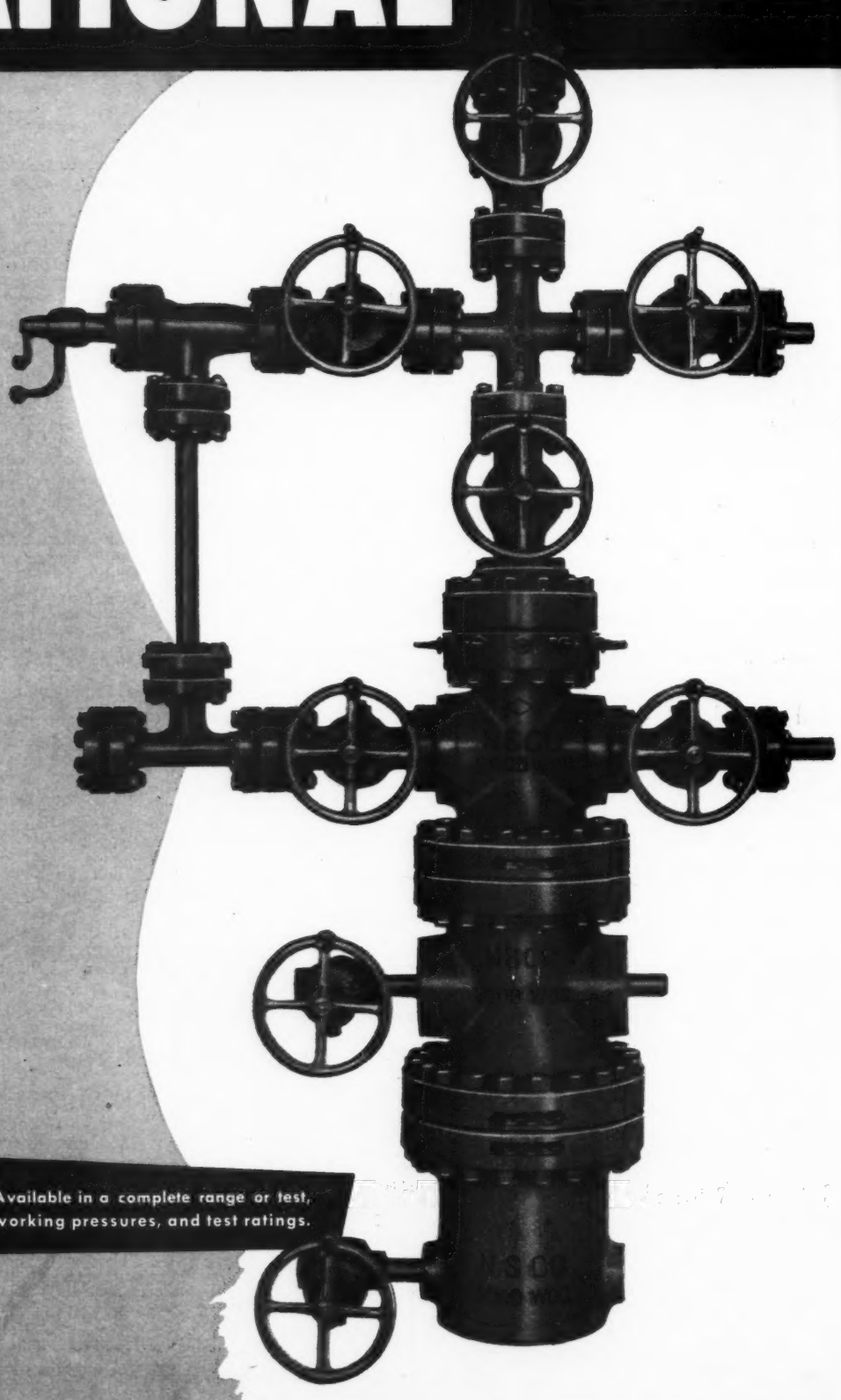

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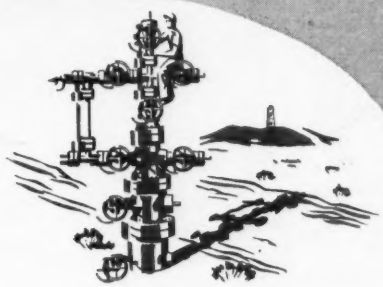

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and this cost includes labor, amortization, and fixed charges. Where labor is already available on a part-time basis, this value may be used for estimating the cost of operation for smaller plants, inasmuch as the fixed charges are almost in direct relation to the plant size. The initial investment cost for a 50-ton-per-day plant would be approximately $350,000.

Start With Hydrogen Sulfide

In general, the raw material for sulfur manufacture is byproduct gaseous hydrogen sulfide, as available from the stripping section of a tripotassium - phosphate or ethanolamine-type gas-purification unit. This hydrogen sulfide may be contaminated with carbon dioxide and some hydrocarbons, and some special processing may be required, depending on the concentration of the hydrogen sulfide in the gas mixture.

Actually, sulfur recovery from hydrogen sulfide has been carried out for almost 100 years in Europe and in England, and due to this long period of operation, rather efficient and simplified types of plants have been developed, primarily due to efforts of German industry.

In the early stages, elemental sulfur-recovery units were constructed in accordance with the original Claus process, similar to that as shown on flow diagram, Fig. 1. In this process, hydrogen sulfide was admixed with air, and burned in a large combustion chamber containing a catalytic material, and which was called the Claus kiln. A reaction took place in accordance with Equation 1.

$$3\,H_2S + 1\tfrac{1}{2}O_2 \rightarrow 3S + 3H_2O + 159 \text{ kg. cal.} \quad (1)$$

Due to the large quantity of heat liberated in this reaction, the operating temperatures encountered were extremely high and resulted in only partial conversion to elemental sulfur. Low operating temperatures favor more complete conversion, and 700° F. is ususally considered an optimum operating temperature.

In an effort to correct this difficulty, later German plants were constructed as shown on flow sheet, Fig. 2, and some temperature control was obtained by the dilution of the incoming hydrogen sulfide with the waste vent gases from the unit.

First Material Advance

The first material advance in the art was initiated by I. G. Farbenindustrie, A.G., and a process was developed which separated the reaction as shown in Equation 1 into its component parts as shown below:

$$H_2S + 1\tfrac{1}{2}\,O_2 \rightarrow SO_2 + H_2O + 124\text{-}138 \text{ kg. cal. (in steam boiler)} \quad (2)$$

$$SO_2 + 2H_2S \rightarrow 3S + 2H_2O + 21\text{-}35 \text{ kg. cal. (in catalytic reactor)} \quad (3)$$

The I. G. process as shown on flow sheet, Fig. 3, carried out the initial reaction (2), in which the major portion of the heat is produced, under a steam boiler, and utilized the heat for the generation of steam. One-third of the quantity of hydrogen-sulfide-bearing gas was burned under the boiler, and products of combustion at approximately 900° F. were then admixed with the remaining two-third portion, and passed through a catalytic reaction vessel at approximately

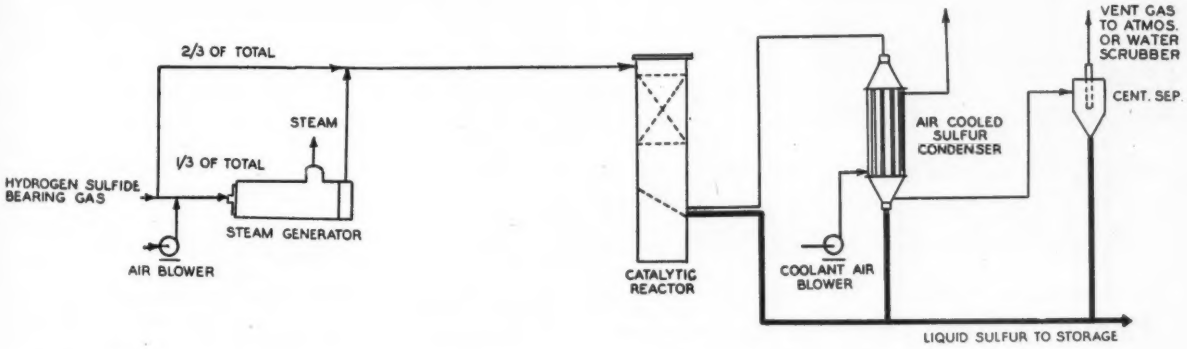

Fig. 3—(Above) I. G. Farbenindustrie-Claus process for production of elemental sulfur

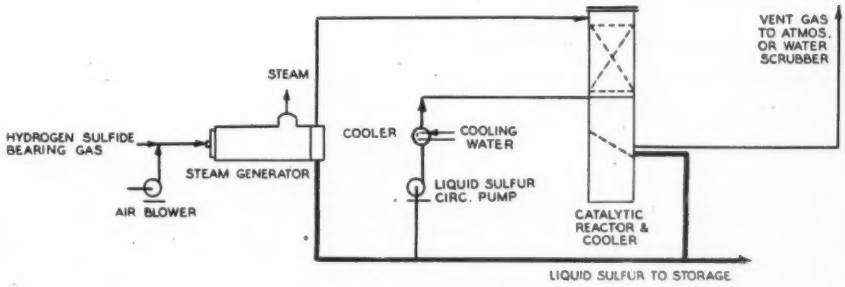

Fig. 4—(Right) Improved I. G. Farbenindustrie-Claus process for production of elemental sulfur

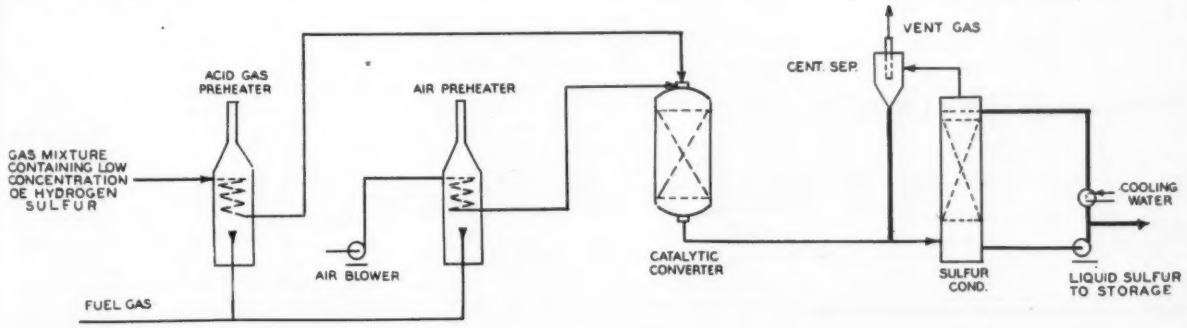

Fig. 5—(Below) Unit suitable for recovery of elemental sulfur from gases containing relatively low concentrations of hydrogen sulfide

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700°-750°, in order to obtain 92-94 per cent conversion to elemental sulfur. If 99 per cent conversion is required, an additional catalytic reactor and sulfur condenser is employed on the vent gases from the unit.

A later modification of this same process as shown on flow sheet, Fig. 4, eliminated the necessity of separating the two hydrogen sulfide streams, and permitted the fire box of the steam boiler to act as a noncatalytic, high-temperature reactor where approximately 60-65 per cent of the final reaction took place, while the partially cooled flue gases from the boiler were then passed into the catalytic reaction vessel, and final conversion to sulfur was obtained at this point.

The advantage of all these improvements in operating procedures has been increased plant efficiency, and smaller plant sizes for equivalent sulfur production. The initial design value for the allowable space velocity for the Claus process was 3 cu. ft. of hydrogen sulfide converted to elemental sulfur per cubic foot of catalyst; however, the latest designs embody values as high as 200 cu. ft. of hydrogen sulfide converted per cubic foot of catalyst.

In some instances, the quantity of hydrogen sulfide present in the gas mixture is not sufficient to support combustion under a steam boiler, and in such cases, external heat must be applied to bring the reactants to operating temperature, and such an arrangement is shown on flow sheet, Fig. 5. This arrangement can also be utilized for the simultaneous desulfurization and sulfur recovery of natural gas containing appreciable quantities of hydrogen sulfide, or from carbon dioxide-hydrogen sulfide mixtures which are largely carbon dioxide, and will not support combustion.

Anglo-Iranian

Anglo-Iranian Oil Co. is reported to be recovering elemental sulfur direct from hydrocarbon gases by means of the selective partial oxidation of the hydrogen sulfide present in the hydrocarbon gases by air injection in the hydrocarbon gas, followed by heating and passing through a catalytic reactor. In addition to the removal of the hydrogen sulfide, the elemental sulfur produced is used for the manufacture of sulfuric acid, which is utilized in refinery operations to remove additional sulfur compounds from liquid hydrocarbons. Such a procedure can be advantageously utilized in steam generation plants employing large quantities of sour gas as fuel, inasmuch as elemental sulfur could be recovered from the fuel gas prior to combustion in the fire box, and at a minimum investment.

Catalysts usually employed for this reaction are agents having a high degree of surface activity, such as alumina, bauxite, pumice, porous iron oxide, and silica gel. The most common agent utilized is natural bauxite containing 5-15 per cent iron oxide as an impurity. Space velocities in the neighborhood of 100 are obtained with this type of material, and it is satisfactory for long periods of operation without replacement.

It is interesting to note that some solid-bed aluminum oxide-type gas-dehydration units in sour-gas service have failed to operate satisfactorily due to the reaction of oxygen in the natural gas with the hydrogen sulfide present in the gas, due to the catalytic nature of the solid desiccant employed which acts as an efficient sulfur production catalyst for this reaction. Such sulfur formation occurs below the melting point of sulfur, and the sulfur is deposited in the pores of the desiccant, and causes poor gas-drying efficiency, and eventually the whole vessel becomes filled with elemental sulfur.

Construction Material

The material of construction employed for sulfur-recovery plants is usually ordinary cast iron or carbon steel; however, precautions must be taken to insure that all the gases handled are above their water dew points, in order to insure corrosion-free operations.

Catalytic reactors, heaters, etc., are usually insulated on the inner surface, and this eliminates the necessity of utilizing high-temperature-type alloy steels for the construction of these items.

The major portion of the mechanical design of an elemental sulfur-recovery unit is usually centered around the sulfur condenser and separator, inasmuch as it is necessary to maintain certain critical velocities at this point, and due to the many different physical changes that occur in liquid sulfur with changes in temperature, rather careful temperature control of the sulfur separating system is required.

Actually, the manufacture of elemental sulfur closely parallels the utilization of natural gas for carbon-black production, and the analogy becomes apparent upon comparing the hypothetical Equation 4 below with Equation 1:

$$H_4C + O_2 \rightarrow C + 2H_2O \qquad (4)$$

Many of the problems encountered in carbon-black production regarding the separation of the carbon formed are also encountered in the field of sulfur manufacture. The separation is further complicated by the fact that a liquid is being handled rather than a solid.

Electrostatic precipitators can be employed for this separation; however, such an installation is usually not justified from an economic standpoint.

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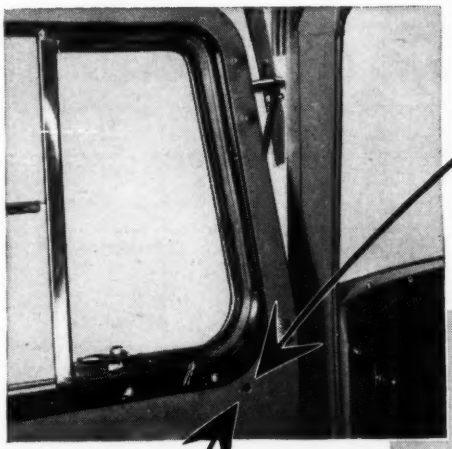

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Luis Guillermo Duran S. is an engineer with Texas Petroleum Co., at Bogota, Colombia. He is a member of the Colombian Petroleum Institute, the Natural Sciences Society of Bogota, the South American Petroleum Institute, and the American Congress on Surveying and Mapping. He has authored many articles pertaining to the petroleum industry.

COMPILED FORMULAS

Structural

by Luis Guillermo Duran S.

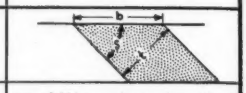
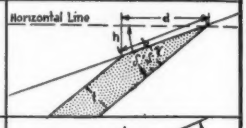
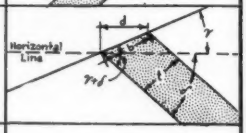
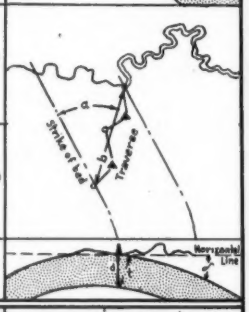
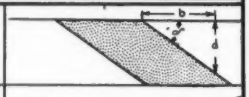
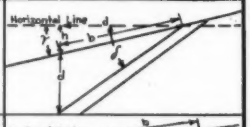
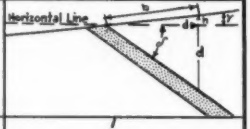
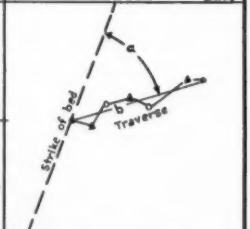
CALCULATIONS for thickness, depth, and dip are perhaps the most frequent problems met in practical structural geology. In the analytical solution of these problems geologists and engineers need to use a variety of trigonometrical formulas. Some are given here, with derivation and discussion; also several excellent references and text books.

Tables 1 and 2 present the summaries. They are believed to be handy references for any given case, and their use should avoid the task of searching through several books or at least through many pages of one book when the need of using them arises in connection with structural problems.

The tables are based mainly on Chalmers' "Geological Maps" (1926), Earle's "Dip and Strike Problems" (1934), and Billings' "Structural Geology." However, the writer is also indebted to C. W. Hayes (1909), A. Grabau (1913), Dake-Brown (1927), Greenly-Williams (1930), Willis-Willis (1934), and F. H. Lahee (1941) for the influence that their books have had in this work.

Table 1

THICKNESS AND DEPTH COMPUTATIONS

REQ'D	GIVEN	FORMULA*	DIAGRAM
THICKNESS	A 1—Breadth of outcrop normal to strike 2—Dip 3—Horizontal ground	$t = b \sin \delta$	
	B 1—Breadth of outcrop normal to strike (or distance) 2—Dip 3—Slope of ground in the same direction as dip (or difference in elevation)	$t = b \sin (\delta - \gamma)$ $t = D \sin \delta + h \cos \delta$	
	C 1—Breadth of outcrop normal to strike (or distance) 2—Dip 3—Slope of ground in the opposite direction to dip (or difference in elevation)	$t = b \sin (\delta + \gamma)$ $t = D \sin \delta - h \cos \delta$	
	D 1—Breadth of outcrop at an angle α with strike (or distance) 2—Dip 3—Slope of ground in the same direction as dip (or difference in elevation)	$t = b (\sin \delta \cos \gamma \sin \alpha + \sin \gamma \cos \delta)$ $t = D \sin \delta \sin \alpha + h \cos \delta$	
	E 1—Breadth of outcrop at an angle α with strike (or distance) 2—Dip 3—Slope of ground in the opposite direction to dip (or difference in elevation)	$t = b (\sin \delta \cos \gamma \sin \alpha - \sin \gamma \cos \delta)$ $t = D \sin \delta \sin \alpha - h \cos \delta$	
	F 1—Depth 2—Dip	$t = d \cos \delta$	
DEPTH	A 1—Breadth of outcrop normal to strike 2—Dip 3—Horizontal ground	$d = b \tan \delta$	
	B 1—Breadth of outcrop normal to strike (or distance) 2—Dip 3—Slope of ground in the same direction as dip (or difference in elevation)	$d = b (\cos \gamma \tan \delta - \sin \gamma)$ $d = D \tan \delta - h$	
	C 1—Breadth of outcrop normal to strike (or distance) 2—Dip 3—Slope of ground in the opposite direction to dip (or difference in elevation)	$d = b (\cos \gamma \tan \delta + \sin \gamma)$ $d = D \tan \delta + h$	
	D 1—Breadth of outcrop measured at an angle α with strike (or distance) 2—Dip 3—Slope of ground in the same direction as dip (or difference in elevation)	$d = b (\tan \delta \cos \gamma \sin \alpha + \sin \gamma)$ $d = D \tan \delta \sin \alpha + h$	
	E 1—Breadth of outcrop measured at an angle α with strike (or distance) 2—Dip 3—Slope of ground in the opposite direction to dip (or difference in elevation)	$d = b (\tan \delta \cos \gamma \sin \alpha - \sin \gamma)$ $d = D \tan \delta \sin \alpha - h$	
	F 1—Thickness 2—Dip	$d = \frac{t}{\cos \delta}$ $(= t \sec \delta)$	

*NOTATION: δ = dip; γ = ground slope; α = angle between strike and traverse; t = thickness; d = depth; b = breadth of outcrop; d = distance (horizontal); h = difference in elevation.

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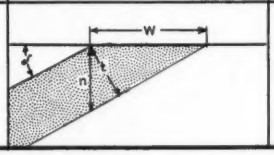
FOR PROBLEMS IN

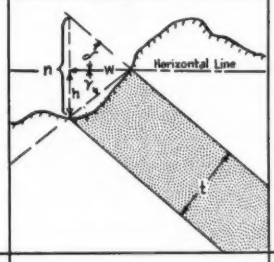
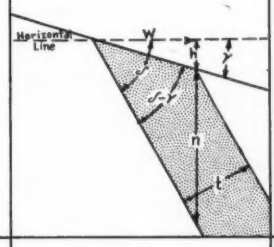
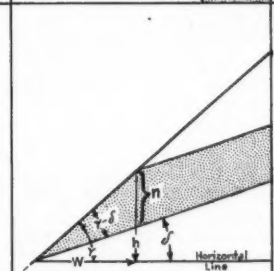
Geology

Table 2
DIP COMPUTATIONS

A—HORIZONTAL GROUND

FOR DIP LESS THAN 30°*	DIAGRAM	FOR DIP GREATER THAN 30°
$\text{Tan } \delta = \frac{t}{w}$		$\text{Sin } \delta = \frac{t}{w}$

B—SLOPING GROUND

FOR DIPS LESS THAN 30°*	DIAGRAM	FOR DIPS GREATER THAN 30°
1—Dip in the opposite direction of ground slope $\text{Tan } \delta = \frac{t-h}{w}$		1—Dip in the opposite direction of ground slope $\text{Sin } (\gamma + \delta) = \frac{t \cos \gamma}{w}$
2—Dip in the same direction as, and steeper than ground slope $\text{Tan } \delta = \frac{t+h}{w}$		2—Dip in the same direction as, and steeper than ground slope $\text{Sin } (\delta - \gamma) = \frac{t \cos \gamma}{w}$
3—Dip in the same direction as, but less steep than ground slope $\text{Tan } \delta = \frac{h-t}{w}$		3—Dip in the same direction as, but less steep than ground slope $\text{Sin } (\gamma - \delta) = \frac{t \cos \gamma}{w}$

*These formulas give only approximate values, because n is substituted by t, assuming that, due to low dip, they are equal.

NOTATION: δ = dip; γ = ground slope; t = thickness; w = width of outcrop (distance); h = difference in elevation.

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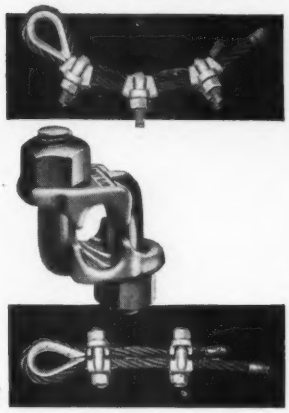

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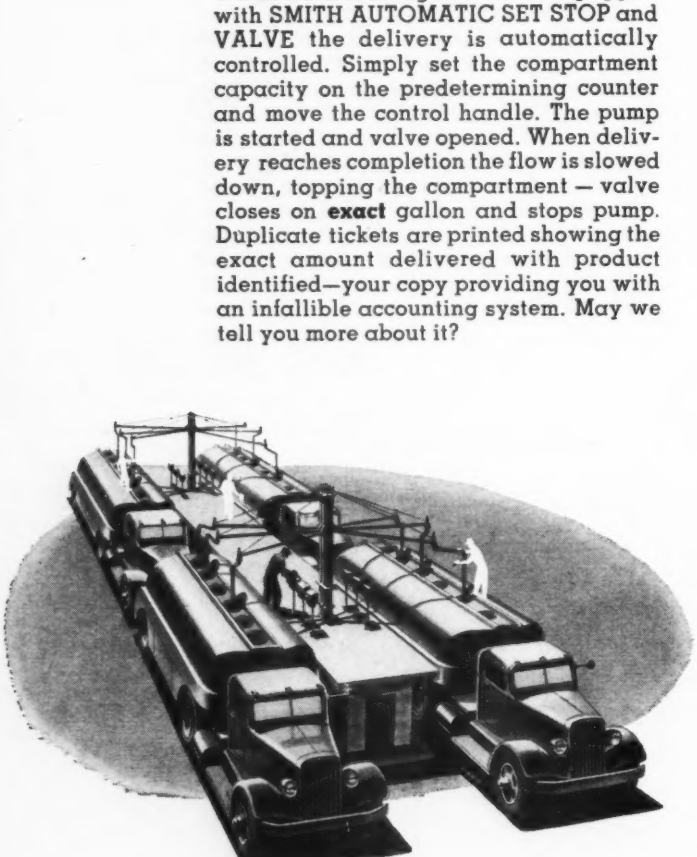

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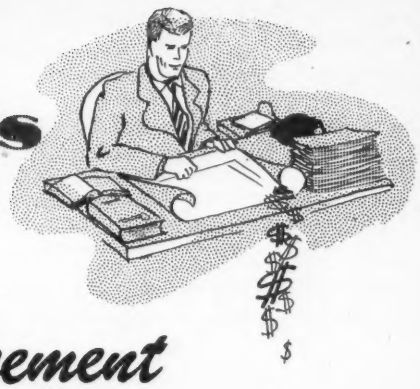
ECONOMIC FACTORS INVOLVED IN Workover Operations And Equipment Replacement



by Neill Ferrill*

ECONOMICS, the science that treats of the production and use of wealth, is probably one of the most controversial elements concerned with the production of oil, since it permits varying conclusions to be formed for the same problem. This is so because economics is not an exact science and, therefore, lends itself to individual judgment and interpretation of matters vital to analyses. Expert economists frequently differ widely in their views and conclusions concerning specific problems.

It follows therefore that members of the operating personnel of an oil company will sometimes have differences of opinion with respect to the merits of certain proposals. There might be numerous causes for reaching an erroneous conclusion to an economic problem, however, these causes can be summarized as follows:

1. Failure to approach the problem in an unbiased manner.
2. Use of inadequate or incorrect basic data.
3. Incorrect use and analysis of available data.

This discussion is limited to the economics involved in equipment replacements and reconditioning or workover operations on oil and gas wells. Its main purpose is to point out some of the major factors to be considered and briefly to outline a procedure for analyzing proposals for this type of work.

Equipment Replacements

In making an economic analysis the fact should be borne in mind that the conclusion reached can be no better than the basic information and judgment used in making the investigation. Therefore, care should be taken to utilize the best sources of information and judgment available. It should also be emphasized that a calculation showing that the remaining reserves of a well or lease are sufficient to pay out the cost of a job and return a profit does not constitute a complete analysis. In order to justify spending the money for the job under consideration, additional supporting data must therefore be included to indicate that the work proposed is probably the best solution to the problem.

In considering equipment replacements the type of equipment to be used has a very important bearing on the economics of the job and care must be taken to select the type and size best suited to the specific purpose and which will operate most economically on the well or lease involved. This part of the analysis should be carefully considered by the mechanical engineers. However, their decision will through necessity sometimes be influenced by availability of material.

Other Considerations

After the type of new equipment has been selected, other important considerations are:

1. Condition of present equipment and urgency of need of replacement (i.e., is replacement actually necessary or is it feasible to repair and continue to use the old equipment?)
2. Cost of proposed replacement.
3. Present and probable future producing rate of the well or wells (a) with present (or old) equipment; (b) with proposed new equipment.
4. Probable future operating cost (a) with the old equipment; (b) with the new equipment.
5. Oil and gas reserves and future profit (a) with the old equipment; (b) with the new equipment.

Stated briefly, a comparison should be made of the profit expected with the old and new equipment.

A thorough analysis of a proposal for the replacement of equipment will sometimes indicate that although the equipment then in use is in poor condition and probably has a comparatively short remaining life, future profit which may be expected from its continued operation will be greater than can be anticipated if the equipment were replaced. In other words, the possible reduction in operating expense and increased oil recovery will be insufficient to offset the cost of making the replacement. Where such a situation is indicated, approval of the job, of course, cannot be recommended from the standpoint of operating economics.

A good example of a job of the above kind, and to which the foregoing procedure would apply, is a proposal to replace an old rig front and gas engine with modern pumping unit and engine for the purpose of reducing operating expense and providing more efficient operation. An analysis of a proposal of this kind could follow a procedure such as this:

Conditions.—Present rig front and gas engine is old and in poor condition, and major repairs will soon be necessary in order to continue satisfactory operation. Consideration is given to replacement with a modern pumping unit and engine at a cost of $7,000. It is estimated that the salvage value of this new equipment will be $1,000—making the unrecoverable cost of the job $6,000.

Production.—Tests show that the normal producing rate of the well is 8¼ bbl. of oil with 340 bbl. of water per day and a study of the production and well tests during past years indicates the future production rate might be expected to decline as follows:

Year	Gross bbl. per day
1st	7.5
2nd	6.7
3rd	6.0
4th	5.4
5th	4.8
6th	4.3
7th	3.9
	38.6 × 365 days = 14,089 bbl.
8th	3.5
	42.1 × 365 days = 15,367 bbl.

An examination of the lease operations statement and well-repair cost records indicate that if the present equipment were in satisfactory operating condition, the well could be operated at a profit until production had declined to about 3½ bbl. per day. After the future normal eliminable

*Gulf Oil Corp., Tulsa. Material from recent Gulf engineering conference, held in Tulsa.

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expense is determined, this estimate is arrived at in this manner:

ESTIMATED FUTURE MONTHLY ELIMINABLE OPERATING EXPENSE

Well repair expense	$155
Pumper labor, fuel, supplies, and misc.	70
Economic limit, bbl./day	$225 ÷ $65* = 3.5

*Net working interest value of a barrel of oil per day for 1 month after deducting royalty and production tax, assuming a price of $2.58 per barrel.

It is then estimated that the cost of major repairs that will be necessary to put the present equipment in satisfactory operating condition will be $1,500. The calculation of future profit that might be expected if these repairs are made and operation is continued with the old equipment is shown below:

	Gross oil		Working interest		Price per bbl.		Prod. tax deduction		
Revenue:	14,089	×	.875	×	$2.58	×	.95	=	$30,216
Expense:	Cost of major repairs now necessary							=	$ 1,500
	Future eliminable operating expense, $225 × 84 months							=	18,900
									20,400
Estimated profit with the old equipment									$9,816

For the purpose of comparing this profit with what might be expected from the new installation further investigations and estimates reveal the following:

No appreciable improvement in the producing rate is anticipated since the well can be operated at capacity with the present equipment after the necessary repairs are made. The main advantages of the new installation will be a saving in operating expense and a small increase in oil recovery as a result of a possible extension of the economic life. Future operating expense with the new equipment is estimated at $190 per month which will give the well an economic operating limit of about 3 bbl. per day. The profit that might reasonably be expected with this new equipment is estimated as follows:

Revenue:	15,367	×	.875	×	$2.58	×	.95	=	$32,956
Expense:	Unrecoverable cost of new installation							$6,000	
	Future eliminable operating expense, $190 × 96 months							18,240	24,240
Estimated profit with the new equipment									$8,716
Indicated loss from installing new equipment instead of repairing old									$1,100

In this example the difference in profit shown by the two installations is comparatively insignificant, especially when it is remembered that both sets of figures are estimates based to some extent on individual judgment and are therefore subject to error. However, the calculation does indicate that it will be to the operator's advantage to continue the use of the old equipment and this procedure has the additional very desirable advantage of requiring an immediate cash outlay of only $1,500 as compared to $7,000 for the new equipment.

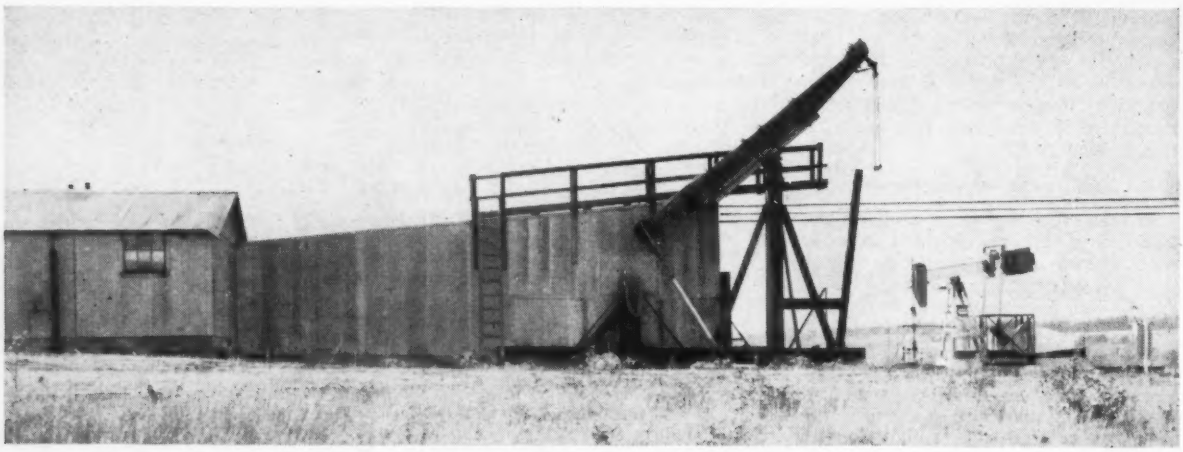
In a case, however, where present equipment is already broken down or is actually beyond repair, the analysis would follow a somewhat different course from that heretofore outlined. In this case the problem would be the type of equipment to be installed and whether the future revenue will exceed the net cost of the equipment and operating expenses. In a problem of this kind, as well as the one first mentioned, it is often necessary to compare the probable profit that might be expected using various types of equipment.

There have been cases and may be other such cases in the future where replacement of equipment is considered advisable in order to bring the appearance of the property up to a higher standard or to eliminate hazard to personnel or property. Where this is the main justification for the replacement, it should be so stated in the recommendation rather than attempt to justify it solely for other reasons.

Expense vs. Investment

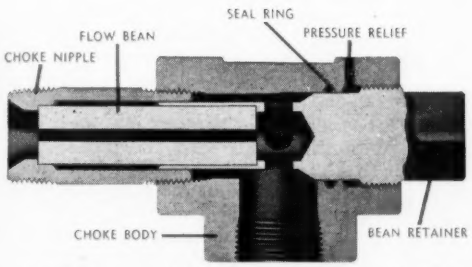
Another factor which is often of considerable importance in an economic analysis similar to the above is the method of accounting that will apply to the expenditure involved. This is important because under the operator's established accounting procedure one type of installation or a portion of it might be chargeable to an investment account while another type might be entirely chargeable directly to operating expense. Since expenditures charged to expense are deductible from taxable income in the current year's business and investment items are deductible only to the extent of the depreciation allowed in the current year, the operator's cash position at the end of the taxable year is enhanced by selecting the expenditure that can be properly charged to expense.

The advisability of making major repairs or replacements on wells where only a small future operating profit over an extended period can be foreseen, is dependent on the conditions involved in each particular case. However, factors which should not be overlooked in such cases are additional depreciation and decline in value of the recoverable equipment in use at the well, and a further reduction in actual value of the future

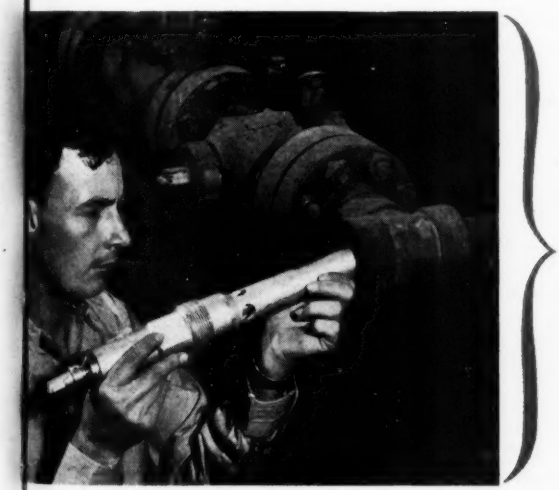


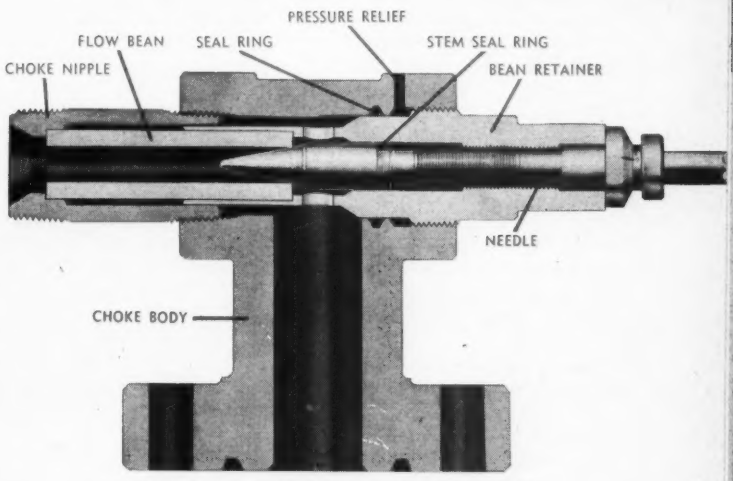
Equipment replacement.—This is a view of the "old" and the "new." Detailed analysis of this situation indicated that the well had a future life and oil reserves to more than justify the installation of the new electric unit pumper. Specifically, the estimated total future savings to be effected by the new equipment through reduction in maintenance cost and pumper labor alone was sufficient to pay out the new equipment

These are the NEW Cameron PRODUCTION CHOKES



POSITIVE TYPE "G"





ADJUSTABLE TYPE "G"

Above are presented cross-section views of the Positive and Adjustable models of the Cameron Type "G" Production Choke. The Cameron forged steel body, which is available either threaded or flanged, and in pressures up to 5000 Lbs. W.P., accommodates either the adjustable or positive assembly.

A unique feature of these new chokes is the manner in which flow beans are changed. Note that the bean retainer fits snugly around the bean so that the bean is automatically retrieved when the retainer is backed out of the body. NO BEAN WRENCHES ARE REQUIRED FOR THIS OPERATION. Choke changing is fast and easy. Note, also, that as a safety measure trapped pressure is automatically relieved as the bean retainer is backed out, but before the retainer is disengaged from the body.

Interested operators are invited to write for complete details.

CAMERON IRON WORKS, INC.

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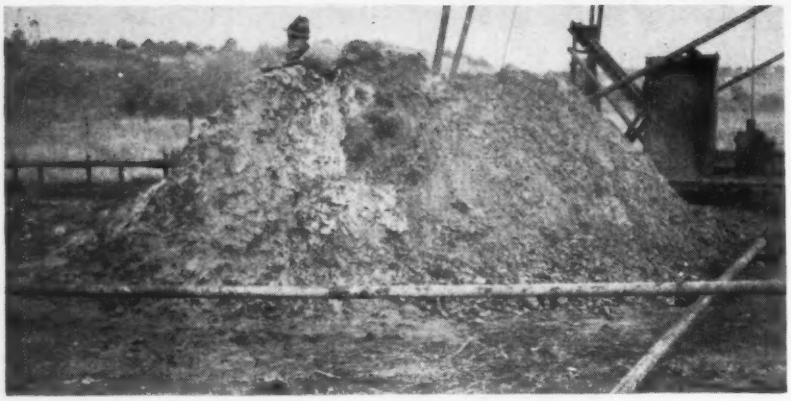


Workover operations—Results of cable-tool clean-out work on a well in Creek County, Oklahoma, to remove cavings accumulated over long period of time after heavy initial shooting. The quantity of sand removed and consequent size of formation "pocket" opened up is indicated by head of man standing behind the large pile of "sand bailings"

revenue caused by deferment of the income and by income taxes.

Reconditioning or Workover Operations

Reconditioning or workover includes such jobs as acidizing, bailing, cleaning out, deepening in same formation, deepening to a new formation, injecting oil into formation, jetting formation to remove gyp or other substances from face of sand, plugging back to shut off water, plugging back to a new formation, shooting, washing face of formation to remove paraffin or salt, etc.

An analysis of a proposal for this type of work on a well includes consideration of the following factors:

1. Information on past and present producing rate.
2. Present allowable production.
3. Method of producing.
4. Condition of hole (feet of cavings or amount of iron in hole).
5. Condition of equipment.
6. Initial completion record.
7. Core data, electric-log data, formation-water level, and location of oil pay.
8. Results of any reconditioning or workover jobs subsequent to completion.
9. Comparison of present producing rate with what might be considered normal.
10. Study of results of any similar jobs done on other wells in the same area.
11. Increased production expected from proposed job.
12. Payout time.
13. Budget status.

For convenience and guidance in making an investigation of the possibilities of reconditioning or working over a well, a mimeographed or printed form providing a space for these items and the available data under each caption has been found very helpful to some operators.

Deepening or Plug Back

In addition to the information shown above, a recommendation to exploit a new horizon, either by deepening or plugging back, should be accompanied by a recommendation from a qualified geologist. It may often appear clearly evident that a job should be done, but since a geologist who is familiar with the area is in a position to have the best information on the possible presence of oil and gas in a reservoir, his opinion is always important and essential. However, a favorable geological opinion alone is not sufficient, in some instances, to justify spending the money that will be necessary to open another formation but the recommendation should be accompanied by engineering data and an economic analysis showing that there is a reasonable possibility of realizing a profit from the work. In the performance of jobs of this kind it is also essential that the geologist be consulted in order to insure adequate testing of the possible productive zone.

As in the case of equipment replacements discussed above, before an expenditure can be justified, an analysis of the prospects of a reconditioning or workover job must indicate a reasonable chance for a profit. Also the possibilities of a profit must outweigh any hazard that might be involved in the performance of the work.

For instance, in some areas production from one zone is often temporarily interrupted so that another zone can be exploited and the two produced simultaneously. However, it obviously would not be good economics to temporarily plug off a good producing section with a high remaining reserve in order to exploit a zone which offers possibilities for comparatively small additional reserves since there is always a chance that production from the other zone might not be reestablished at the former rate.

Occasionally, jobs of an experimental nature are proposed. In such cases consideration should be given and attention called to any similar work that has already been done. The management of a progressive company is not opposed to spending a reasonable amount of money on an experimental job, provided enough work of that nature has not already been done to indicate that there is little or no chance for success, and further provided the company's operations are of such magnitude that the information gained will be useful in future operations.

In order to evaluate properly the results of reconditioning and workover operations, well tests should be taken immediately before and after the work and at periodic intervals thereafter for a long enough period to determine definitely whether or not a sustained increase in production has been obtained. A detailed record should be kept on each job performed and filed for future use. This record together with the well and lease production record will then be available for use as part of the basic data in analyzing proposals for similar work in the same area. An examination of such records will emphasize the fact that a sound recommendation to recondition or workover a well cannot be based on the initial results at a similar well, since good initial increases are sometimes obtained but not sustained long enough to payout the cost of the work.

Possibilities for Old Wells

Reconditioning work is often considered on marginal wells where at best only small increases in productivity can be expected. Some of these jobs are performed as a last resort before abandonment. On all such wells attention must be given to the condition of the producing equipment to determine whether major repairs are likely to be needed, and therefore the analysis must determine whether the possible future revenue will be sufficient to return a profit after paying out both the cost of reconditioning and repairs.

Cleaning out and reshooting old wells which have been shot previously is sometimes proposed and a considerable amount of work of this kind has been done by various operators in past years. Some of these jobs failed to increase production and others have resulted in substantial increases. However, on a good many of the latter, it is not known whether the reshooting was of any benefit or whether the increase was entirely the result of cleaning out cavings which had accumulated in the hole.

Usually, the cost of cleaning out, shooting, and cleaning out again after the shot amounts to about twice the cost of cleaning out only. Therefore,

on future jobs of this kind, unless there is already sufficient evidence to justify shooting, consideration should be given to thoroughly testing the well after cleaning out and before shooting. Then a test after shooting and cleaning out again will give a good indication of what portion of the work, if any, actually benefited the well. The cost of this procedure will, of course, be greater than if the well were shot immediately after cleaning out, but since the results of one job are often used as a basis for recommending similar work in the same area, the comparatively small additional cost would in many instances be entirely justified.

Reserves and Operating Expenses

As set out heretofore, two essential factors in estimating future profit or payout on workover operations and equipment replacements are reserves and operating expenses. Therefore, these items must be carefully estimated and are worthy of special attention. It has been noted that recommendations of various kinds are sometimes accompanied by a statement such as this: "The oil reserves of this well are estimated at 12,000 bbl. over an economic life of 6 years." Such a statement usually means very little unless an estimate of the net value of the reserves is included since a well may have substantial remaining reserves but actually have a very small value because of high operating costs. Also the reserves of a well or lease are often referred to and considered as a fixed amount, while actually they are more or less uncertain and estimates of reserves are frequently subject to considerable adjustment because of changing conditions.

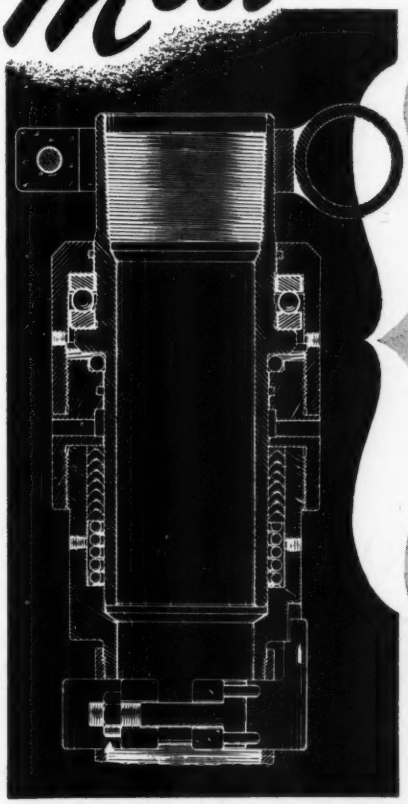
Where good information on operating costs can be obtained, where periodic well tests over an extended period are available, where condition of equipment and producing characteristics are known, an evaluation engineer can make a reasonably accurate estimate of the future rate of production and remaining reserves and life of a well. Unless, however, these facts are available an estimate of reserves and life is often little better than an arbitrary figure, and an economic analysis based on such information is of little value. It is important, therefore, when reserve estimates are made for use in an economic analysis that care be taken to obtain adequate reliable information on the past and present rate of oil and water production, causes of any major fluctuations in production, future operating cost expected, and any other available information concerning the producing characteristics or condition of the well or lease involved.

Future operating cost on a well or lease can be estimated with a reasonable degree of accuracy when good cost records over a 2 or 3-year period are available on the property or on a similar property, provided the person making the estimate is familiar with operating problems and conditions at the well. In such cases the lease-operating expense statements and any other record which might show some reliable information on the maintenance cost or frequency of major repairs are used as basic data to help predict future expense. Allowance must be made, however, for increased cost of material and labor caused by rising prices and also for a small increase which may be expected as a result of additional age of the equipment.

Accompanying is a sample of operating cost data which might be assembled when detailed cost records are available. It will be noted that this statement shows the expense for a one-well lease, and the future eliminable expense of the well and lease is estimated at $250 per month. When it is necessary to calculate the future expense of a well on a lease which has more than one well, the repairs are estimated directly from the well-repair cost record and the other items are prorated on a unit basis. If no individual well-repair cost records are available, the repairs will also have to be prorated on a unit basis.

In the following estimate of future expense the repairs are estimated on

Meet A TEAM that can take it!



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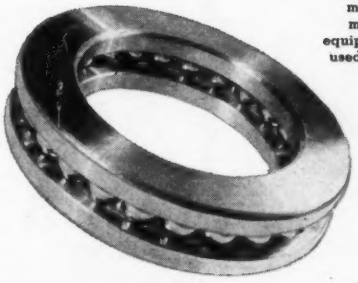

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WHITE MAGIC

The NEW OIL-EMULSION MUD for top-hole drilling

WHITE MAGIC is a readily soluble white powdered material which is added to any regular water-base clay mud with crude or refined oil to produce a low water-loss oil emulsion mud. Its viscosity and gel properties are excellent and the emulsion may be built to any desired weight up to 130 lbs./cu. ft. (17.3 lbs./gal.). White Magic is injected into the pits in the normal manner without interrupting drilling; no extra equipment is needed.

WHITE MAGIC has a low water loss

White Magic has a much lower water loss than any other oil-emulsion or water-base mud in use today. Fluid loss generally drops 90% or more after the emulsion is made with White Magic and, if desired, it is possible to obtain a zero API fluid loss. The saving in cost of chemicals alone often pays for the White Magic. It is electrically conductive and accurate logs are obtained with normal electrical survey equipment. Keeps a hole "to gauge."

WHITE MAGIC saves equipment

White Magic gives lubricating qualities to water-base muds. It helps lubricate bit bearings and reduces number of trips. Drill pipe torque is materially reduced (often as much as 40%) when White Magic is used in the hole, resulting in fewer drill pipe and drill collar failures. White Magic forms a paper-thin, tough, pliable mud cake that lessens the dangers of washouts and stuck pipe. Mud contaminating formations have little effect on it.

Use BLACK MAGIC for drilling "pay zone"

Black Magic oil base drilling fluid has a filtrate loss of zero and is the only fluid recommended for drilling into producing zones, to prevent water-blocking and permanent damage to the formation. Over 3,000 wells have been completed with Black Magic and comparative data with their offsets completed with water-base muds show an ultimate recovery in favor of Black Magic—sometimes as high as ten times greater!

Now, only one company need be consulted for all your mud-control problems, from spud-in to total depth. Call your nearest Oil Base, Inc. representative or write the main office for catalog on both White and Black Magic.

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AVERAGE MONTHLY LEASE OPERATING EXPENSE

	1946	1947	1948	Est'd. future Total	Est'd. future Eliminable
1. Foreman and clerical labor	$100	$ 50	$ 27	$ 27	$ 0
2. Pumper labor	150	100	54	54	54
3. Transportation	5	7	10	10	10
4. Fuel, water and supplies	23	27	24	24	24
5. Treating expense	6	2	3	3	3
6. Salt water expense	4	13	10	10	10
7. Apportioned operations	95	65	30	30	0
8. Miscellaneous expense	10	8	9	9	9
9. Repairs—labor, material, etc.	169	72	94	140	140
10. Total	$562	$344	$261	$307	$250
Number of wells operated	1	1	1	1	1

the basis of average costs over the last 3 years adjusted to conform to increased prices. In order to make this adjustment it has been estimated that the 1946 figure should be increased 25 per cent and the 1947 figure 15 per cent. All other items are based on current costs since because of changing conditions (pumper schedules, source of fuel, etc.), the cost of these items in the past often has little bearing on what future costs will be.

The term "Eliminable Expense" is used in this discussion to designate the items of expense which the operator could eliminate or use to advantage elsewhere if the property to which they are being charged were abandoned or sold. In a study of the economics of a job proposed on a well in an area where the operator has other producing properties it is usually considered correct to use only the eliminable items of expense rather that the total expense assigned to it. In such instances there will be some items such as foreman and clerical labor, salt-water disposal and fresh-water system, and other apportioned charges which would have to be absorbed by other properties and therefore should be excluded from eliminable expense.

The inclusion of a well's pro rata share of the pumper labor as an eliminable item is questionable in some cases. However, it is usually advisable to consider it as eliminable even though no immediate use is foreseen for the pumper's time which would be made available by disposal of the well in question. Frequently when an estimate is made the situation is such that, if the well were abandoned at that time, the amount of the pumper labor chargeable to it would have to be absorbed by other wells. However, the extra time made available will in some cases be of immediate value in allowing for more attention to the remaining wells and also it may soon be fully utilized as a result of other changes in the area.

Furthermore, if a well cannot carry its portion of pumper labor along with the other items of direct expense in a payout analysis, it is about ready for abandonment and should be plugged in order to recover the equipment for use elsewhere. Generally speaking therefore, eliminable expense as referred to herein includes: repairs, fuel, water (except when obtained from operator's central system), supplies, transportation, pumper and other labor, salt-water expense (except when water is disposed of into operator's central system), production tax, and any other item of direct expense necessary in the operation of the well.

In a discussion of this kind it is impossible to cover all phases of the economics of equipment replacements and reconditioning or workover operations. It is equally impossible to lay down a set of rules or a formula by which a correct economic analysis can always be made of proposals for this type of work. However, the more important factors are outlined herein. By full consideration of these factors and the use of the best sources of information and judgment on each specific problem an intelligent approach can be made and a reasonable conclusion can usually be reached.

FRANK W WHEATLEY

Feature of the Week

UNDISPUTED FOR COMPLETENESS OF LINE

Reciprocating Power Pumps from 10 to 300 H.P. Pressures up to 8,000 lbs. Volumes up to 40,000 B.P.D. Direct and V-Belt driven . . . Portable and Stationary . . . Oil - Mud - Acid - Salt Water - Water Flooding.

When It Comes to Pumps, Come to Wheatley

Frank Wheatley Pump & Valve Mfr.

Hale Station, Sand Springs Road, Tulsa, Oklahoma

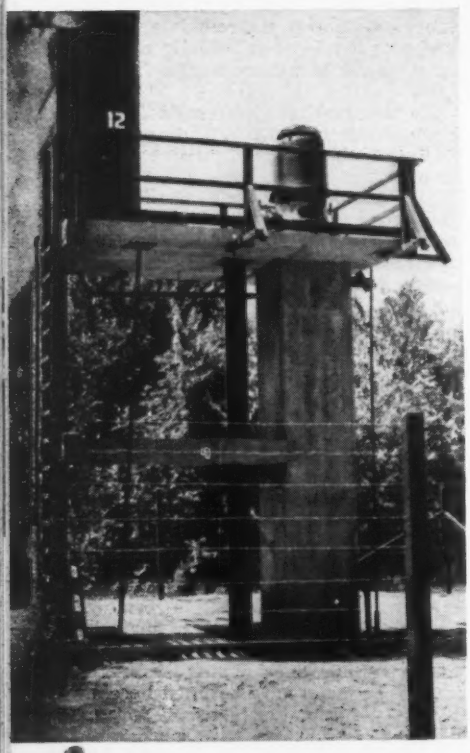
THE OIL AND GAS JOURNAL

"Dear Lover Boy—I've been dreaming of you—Say-y!! Gus gave me his girl's letter; this ain't th' home-office report!"

XUM

Vertical Turbine-Type Pumps Eliminate Flooding Hazards

by Dan R. Rankin *



This type of structure supports both pump and electrical control equipment. Elevation of platform is well above maximum high level of flood water

MANY oil-field operations and refineries depend on the water in rivers and lakes for their cooling or process supply water. Although most of the main plants are located out of flooding areas, of necessity the pumping plants are near the rivers or lakes.

One of the most common and well-remembered stories that one can hear from many a long-term operator is how his pumps flooded out and it was necessary to shut down the whole operation for several days until the motors could be dried out, the debris cleaned from the pump house, and the pumps started again. He will show you marks on the walls above the floor of the pump house indicating the high-water level and will describe the trials and tribulations of getting the pumps back in service and the great cost to the company during the shutdown.

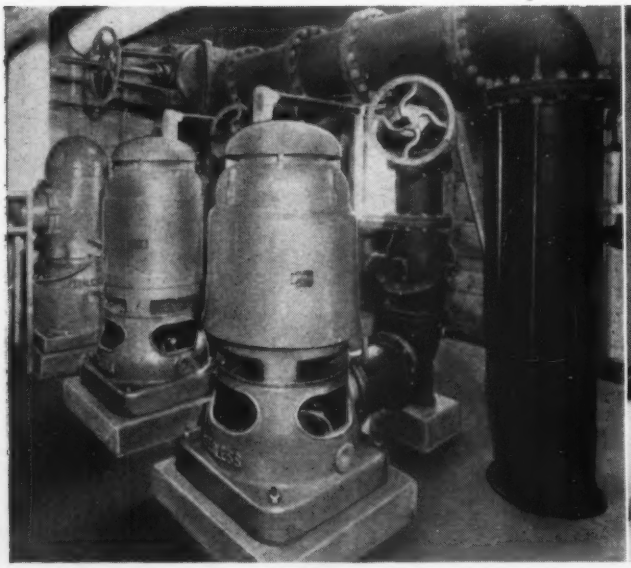
Installation of New Plants

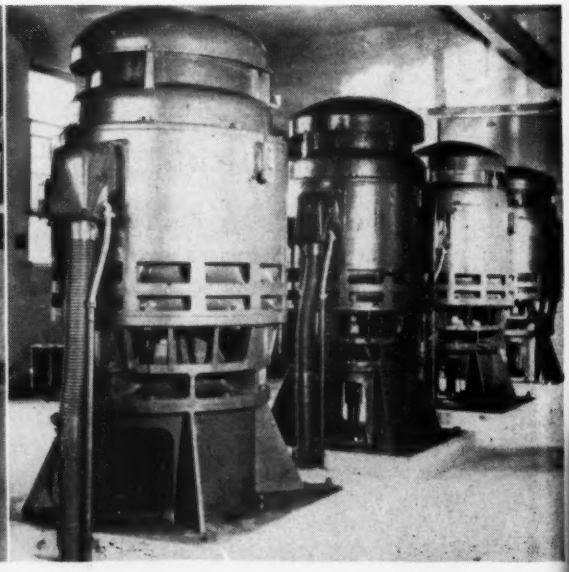
Most of these pumping plants would again be flooded if extreme high water were reached. New plants are usually installed on the assumption that the water will never rise higher than on previous recorded occasions. However, conservative designers will spend thousands of dollars building pump houses with walls well above any previous flood level so that they are positive their pump houses will never flood out. Some designers fail to realize that it is very simple to get the critical driving elements well above the maximum water level and at the same time reduce the pump-house cost and sacrifice no pumping efficiency. However, vertical-shaft turbine-type pumps can be installed with the drivers above any possible water-line based on past records or future probability.

When installing a horizontal pump on a river or lake for the primary source of water supply, it is always desirable to get the centerline of the pump as low as possible to minimize the priming problem. This occasions constructing a suitable dry pit to accommodate the pumps and drivers deep enough so that even during the lowest possible water conditions the pumps cannot only be primed but will operate efficiently without cavitation. It is also necessary to build a heavy concrete wall above the highest possible flood level. There can be no compromise with cost in regions where high variations of water levels exist and additional money is wisely spent to give proper protection.

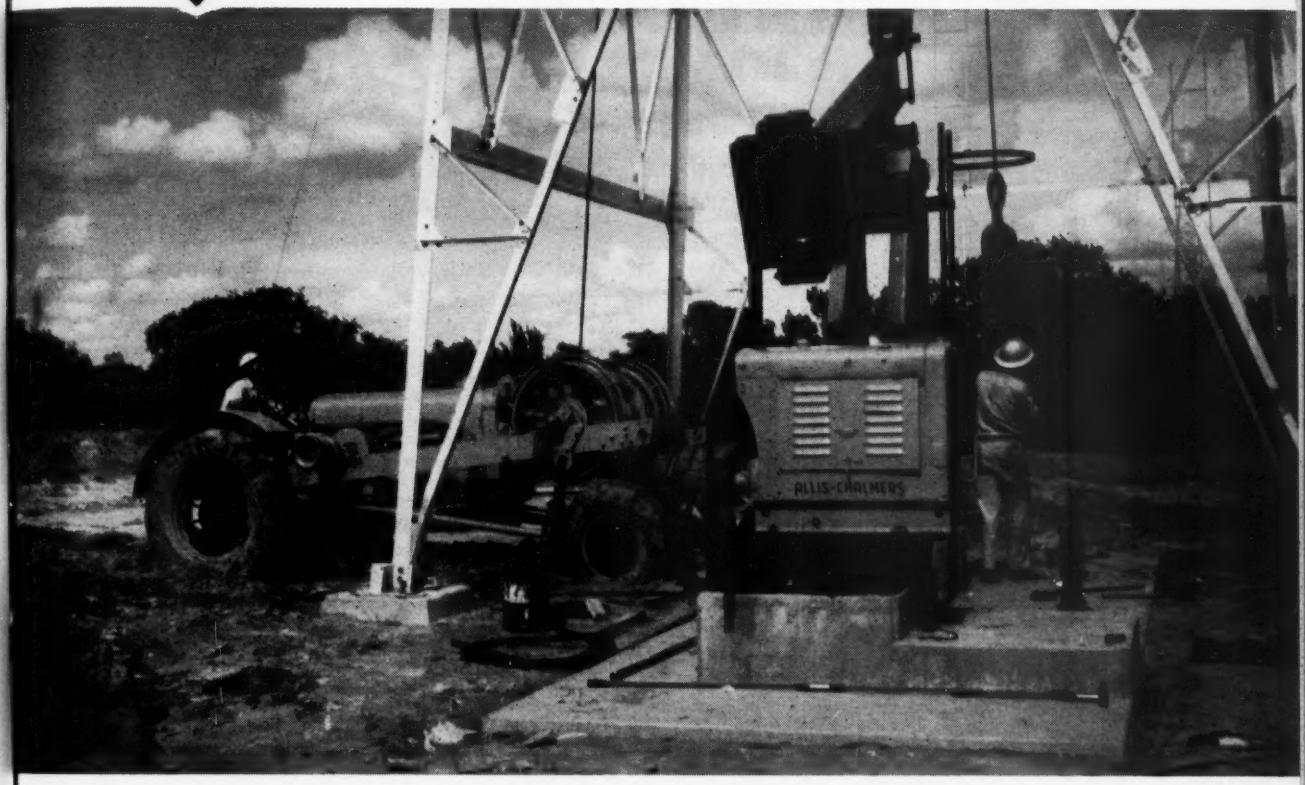
*Chief engineer, Peerless Pump Division, Food Machinery & Chemical Corp., Los Angeles. Presented at winter meeting of National Association of Vertical Turbine Pump Manufacturers.

Left: The pump in the rear of this 3-battery installation is equipped with a right angle drive and operates in standby service. Each of the other 2 pumps operate with electrical drives. Right: Discharge from this group of elevated-floor-level pumps is made several feet below the driver. Connection for discharge may be made at any point between bowl and driver on vertical turbines such as shown here





Here's an unbeatable combination on any lease, An Allis-Chalmers Winch Tractor and a Power Engine Unit.



Maintaining More Profitable Production

The cost of servicing and pumping wells and the maintenance of the equipment can usually be reduced by the use of Allis-Chalmers Units. This equipment is designed and built to do specific jobs in the oil industry. It was not originally designed for another purpose and then adapted to heavier work.

There is only one source of engineering, manufacturing, distribution and service—The Fred E. Cooper—Allis-Chalmers organization—devoting its entire experience and capacity to the production of Power Engine Units, Spudders, Draw Works, Winch Tractors and Skid Winches. For equipment to maintain more profitable production, ask a Cooper Sales Engineer.

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Stick a pin in the map of *any* oil producing country throughout the world and you have marked the location of another Shaffer product in field use. For Shaffer pressure control equipment is universally depended upon to maintain full control of pressure during all types of drilling operations, and for any casing and completion requirement. And Shaffer drilling and fishing tools are equally famous for their dependable operation under varying operating conditions.

For DRILLING

THE SHAFFER COMBINATION ROTATING BLOW-OUT PREVENTER AND STRIPPER combines in *one* tool every feature necessary for successful and simplified drilling under pressure with standard kelly and drill string equipment.

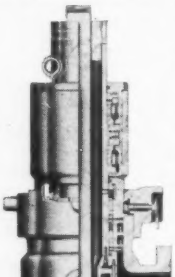
. . . it maintains a *continuous* pressure-tight seal around any shape and any diameter in the drill string (except such abnormally large diameters as the reamer or bit).

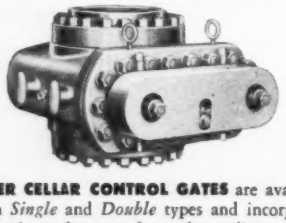
. . . it automatically expands and contracts to maintain its seal as the various diameters in the drill string are stripped through it — without manual adjustments of any kind.

. . . the kelly and stripper rubber rotate *together* — not one inside the other — thus eliminating wear on the sealing element during drilling.

. . . the stripper rubber is protected by an expandable barrier of steel latches so that the rubber cannot extrude under high pressure nor become damaged as large diameters are pulled through it.

. . . it is amazingly compact, requires no special operations or equipment and has many other advantages that make it ideal for all modern pressure control operations.





SHAFFER CELLAR CONTROL GATES are available in both *Single* and *Double* types and incorporate many unique features for safeguarding against pressure emergencies.

. . . they are unusually compact, thus saving valuable cellar space — and the Double Gate combines two ram compartments in one body for the maximum in space-saving compactness.

. . . they can be operated by any type of power — air, hydraulic, electric or steam drives — plus the added protection of full manual standby.

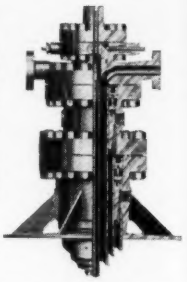
. . . their rams are opened and closed by positive mechanical drive, insuring quick, simple, foolproof operation!

. . . their rams can be quickly changed to fit various pipe sizes by simply removing one end cover, thus saving valuable time and labor when changing rams.

The above are just a few highlights of the many valuable features found in these Shaffer pressure control units. Get full details before buying any pressure control equipment!

For CASING and PRODUCTION

SHAFFER LANDING, CASING AND TUBING HEADS are used in all the major oil producing countries in the world for modern compact casing suspensions and full pressure control while producing.



They are available in many types and various packing arrangements, including types where no internal threads are used for holding the packing element in place, and also types in which all-metal packing elements are used.

For maximum compactness, Shaffer Combination Landing Base Heads combine both a landing base and head in one unit with overall height reduced to the minimum.

In addition, a full line of advanced Tubing Heads, Casing Heads, Multiple Zone Production Hook-Ups and other production equipment is available from Shaffer. *Be sure to contact Shaffer for your Casing, Tubing and Landing Head requirements!*

SHAFFER ADJUSTABLE FLOW BEANS embody unique advancements found nowhere else. Shaffer pioneered Adjustable Flow Beans and offers a wide range of different types for drilling, production and refinery operations. They are available with Conical, Micro, and electrically-heated Thermo Tips in both regular and hard metal designs. All popular sizes — both flanged and screwed connections!

For FISHING

Shaffer Fishing Tools are field proven and dependable for recovery operations on the deepest wells. The complete line includes Rotary Releasing Spears, Rotary Releasing Sockets, including a unique Long Pull Down Type that is ideal for fishing over unknown outside diameters . . . Expanding Pin Taps for taking a firm grip when a coupling or box is up . . . Inside Casing Cutters . . . Straight Pull Rotary Jars . . . Bumper Subs and other similar equipment.

Illustrated at right is the Shaffer Expanding Pin Tap.

NEW THE SHAFFER-WAGGENER BUMPER SAFETY JOINT for modern deep well drill string protection

No other tool gives such complete protection. It is an *automatic* Bumper Sub delivering a sharp jar-down blow by simply lowering the required weight of drill pipe upon it, whereupon the tripping device releases *automatically* to strike the blow. Blows can be struck repeatedly and continuously by simply raising and lowering the drill string. In normal drilling, the tool remains locked at all times, eliminating wear on packing and other parts.

Whenever desired, the tool can also be used as a Safety Joint to release the drill string from stuck drill collars or bits. Simply trip the tool and apply slight reverse torque as the drill string is raised, thus unlocking the Safety Joint and releasing the drill pipe for recovery. Unlike conventional Safety Joints, the Bumper Safety Joint is the strongest — not the weakest — joint in the drill string and transmits full torque in *both* forward and reverse directions when in locked position.

COMPLETE DATA *on the many items in the diversified Shaffer line are contained in the new Shaffer Catalog. Send for your free copy now!*

See pages 3843 to 3894 of your 1948 Composite Catalog for information on Shaffer products.

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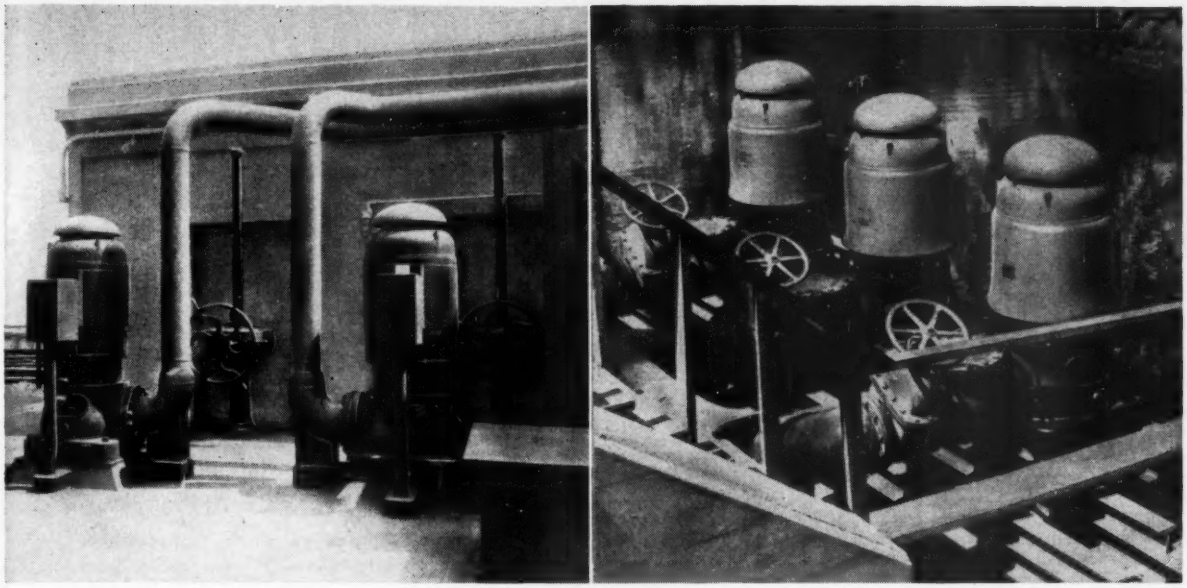

Left: These two pumping units are installed on the working floor of a pumphouse which is far above possible flooding levels. Right: The structural support for these three pumps was constructed at minimum expense

A vertical turbine-type pump is so designed that with a minimum of installation costs the pump bowl units can be located well below the minimum possible water level and yet the driver can be far above the maximum flood stage. The simplification in piping layouts, reduction in costs of the wet-pit pumping plant for the vertical turbine pumps as compared with the expensive larger dry-pit plant for the horizontal pump, and elimination of priming devices, make the vertical water-supply installation very attractive when the over-all picture is intelligently considered. The cost of a vertical turbine pump, which includes the vertical hollow-shaft driver, the discharge elbow, the discharge column pipe, the drive shafting, and the pumping bowl unit almost invariably runs somewhat higher in price than the cost of a horizontal pump with its driver and base plate. However, it is the cost and operation of the complete installation, including the pump house, valves and fittings, suction piping, and the discharge piping up to the same point as the discharge elbow of the vertical pump which enters the complete cost problem. Also, since a vertical turbine type pump takes only a fraction of the floor space required by a horizontal unit, it is often possible to revamp an old horizontal pump house at very little expense, and end up with a modern pumping plant having increased capacity, greater efficiency, no flooding hazard, and no priming or cavitation difficulties.

Frequently accompanying emergency conditions such as floods and storms is the problem of power shortage. A vertical turbine-type pump is suited to the furnishing of a standby driver in the form of either an engine or a steam turbine when the unit is normally connected to an electric motor. Little additional floor space is required since the right-angle gear head, or belted power takeoff, can be mounted directly below the electric motor, and the engine or horizontal steam turbine mounted off to one side. The size of the wet pit is not affected by the standby driver since it is mounted upon the motor floor where it is easy to get at and above flooding hazards.

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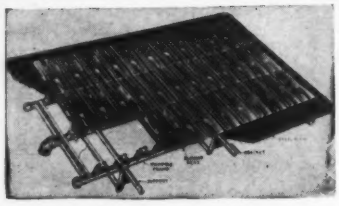

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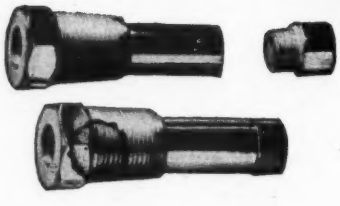

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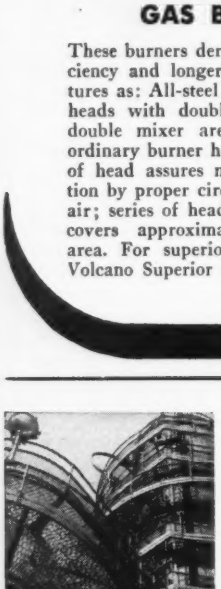

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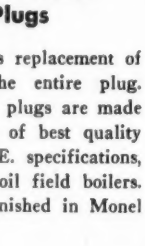

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1—Summarization Statement on:

RELATIVE PERMEABILITY

by Dr. Morris Muskat

AS could have been anticipated from experience in other sciences, the beautiful simplicity of Darcy's law, on which the fundamental concept of permeability was originally based, has been found to be subject to rather severe limitations. Aside from the complications arising even in homogeneous fluid flow due to interactions of the fluid with the porous material and the slippage phenomena encountered at low pressures, there is a basic generalization required when treating actual reservoir materials containing more than a single fluid phase.

Since all reservoir rocks contain connate water, single-phase flow in a strict sense will never be found in actual oil-producing media. While the presence of connate water alone, if immobile, would not in itself require complete abandonment of homogeneous fluid concepts, situations in which two fluid phases, such as oil and gas, are flowing simultaneously in the porous medium do compel a generalization of the permeability concept. As such a generalization, it has been found possible to describe multiphase fluid systems by associating with each fluid phase separately individual permeabilities entering in separate Darcy law relationships for the corresponding phase. These permeabilities to the individual phases have been termed "effective permeabilities," and when expressed as fractions of the homogeneous permeability they are referred to as "relative permeabilities." The latter thus have a range of zero to 1.

While only rather few relative permeability studies have been reported in the literature, data obtained with various types of multiphase systems generally have the same broad characteristics. In the case of the wetting phase these are (1) a rapid fall in permeability as its saturation first falls from unity and (2) an almost complete vanishing of the permeability by the time its saturation has fallen to 15-40 per cent. Nonwetting phases usually will show (1) a measurable permeability only after its saturation has reached a minimum value of 5-20 per cent; (2) a rapid rise in permeability as its saturation is increased beyond the critical minimum value, and (3) an attainment of the full homogeneous fluid permeability before the wetting phase saturation falls to zero.

It has also been found that the permeability to the wetting phase is substantially independent of the nature of the other phases present whether they be oil or gas or a combination of the two. Permeability to the gas phase also is determined primarily by the gas saturation, although the only data reported on three-phase systems indicate a slight variation of the gas permeability with the distribution of the remaining pore space between oil and water. The permeability to oil is much more sensitive to the distribution of the remaining phases, and is not uniquely determined in a given porous medium by the oil saturation alone.

These broad characteristics may be interpreted in terms of the changing distribution of the phases within the pore space as the magnitudes of the saturations vary. In multiphase systems the nonwetting phase will be preferentially concentrated in the larger pores or central parts of the individual pores, whereas the wetting phase will be confined to the parts of the pore space which are relatively less effective for fluid conductivity.

The gross characteristics of the permeability-saturation relationships of porous media suffice to explain directly many of the broad features of reservoir performance. The production of clean oil from formations containing connate water reflects the vanishing permeability of the wetting

Petroleum Reservoir Engineering

Petroleum Engineering Building, University of Texas

MORRIS MUSKAT

University of Texas' department of petroleum engineering (Prof. H. H. Power, chairman) sponsored a special lecture series on reservoir engineering at Austin, February 8-10. The lecture series covered (1) relative permeability, (2) condensate reservoirs, (3) gas-drive performance, (4) gas injection, (5) injection-well histories in water flooding, and (6) partial water drives. While the six subjects were treated in very considerable detail each in a half-day lecture period during the 3-day program, Dr. Muskat also prepared a short "Summarization Statement" on each subject. The first one is published here and the remaining five will appear in subsequent issues. The author is a distinguished reservoir-engineering authority. He is chief of the Gulf Research & Development Co.'s physics division, Pittsburgh. He received B.A. and M.A. degrees at Ohio State University in 1926; was instructor of physics and chemistry at Bowling Green University in 1926-27; teaching fellow at California Institute of Technology in 1927-29, and received Ph.D. there in 1929. He joined Gulf as physicist in 1929, and has been head of physics division since 1935. He was chief of acoustics division, Naval Ordnance Laboratory, Washington, 1942-43. One of Dr. Muskat's best known scientific writings is the 763-page book, "The Flow of Homogeneous Fluids Through Porous Media" (McGraw-Hill Book Co., Inc.). He now has a new book concerned with scientific principles of oil production which will be available soon.

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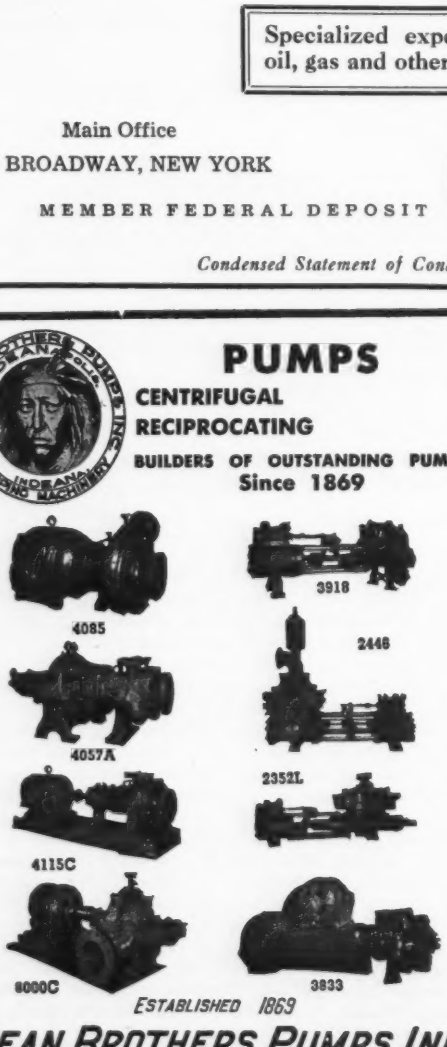

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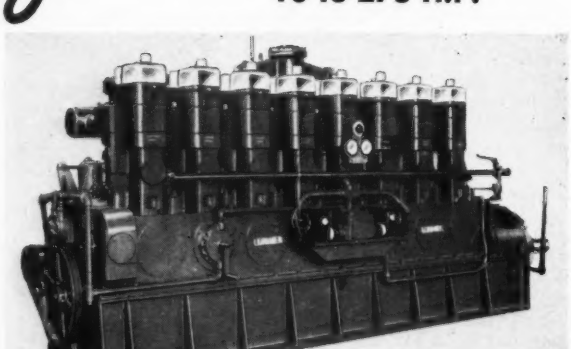

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phase at low saturations. The slow rise in gas-oil ratio in solution-gas-drive fields, and the subsequent rapid rise, can be interpreted in terms of the permeability-saturation curve for nonwetting phases.

It is possible to formulate a complete hydrodynamics structure for multiphase fluid flow on the basis of the generalized permeability concept. While these have not as yet been solved rigorously except for special steady-state systems, they can be approximated and simplified to provide a reasonably satisfactory theory of solution-gas-drive reservoir performance. There are limitations, however, to this formulation and to the generalized Darcy's law for a multiphase flow system. In a strict sense, the latter is in some respects little more than a useful postulate. While the effect of viscosity has been well defined, the roles played by interfacial tensions and pressure gradients are not clearly established. Hysteresis phenomena may also have important effects on permeability - saturation characteristics, and in special problems capillary pressure discontinuities across the fluid interfaces may have to be taken into account.

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R. L. Carruthers, Denver, has resigned as Rocky Mountain division production manager for The California Co. **C. L. Pickett,** former district production manager for the company at Craig, Colo., succeeds Carruthers.

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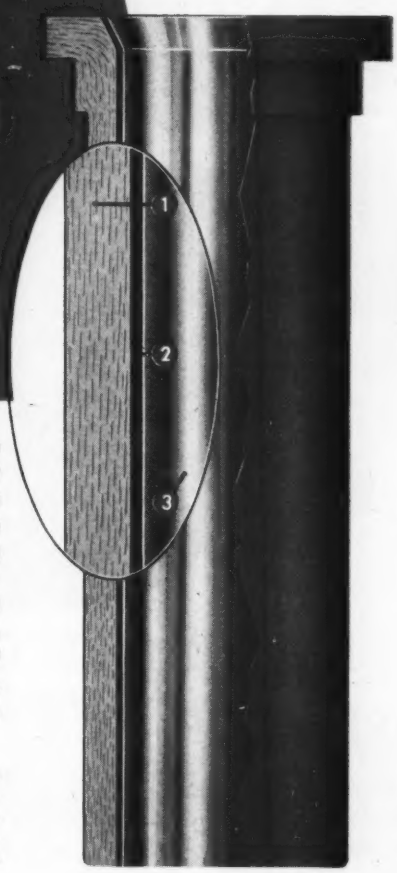

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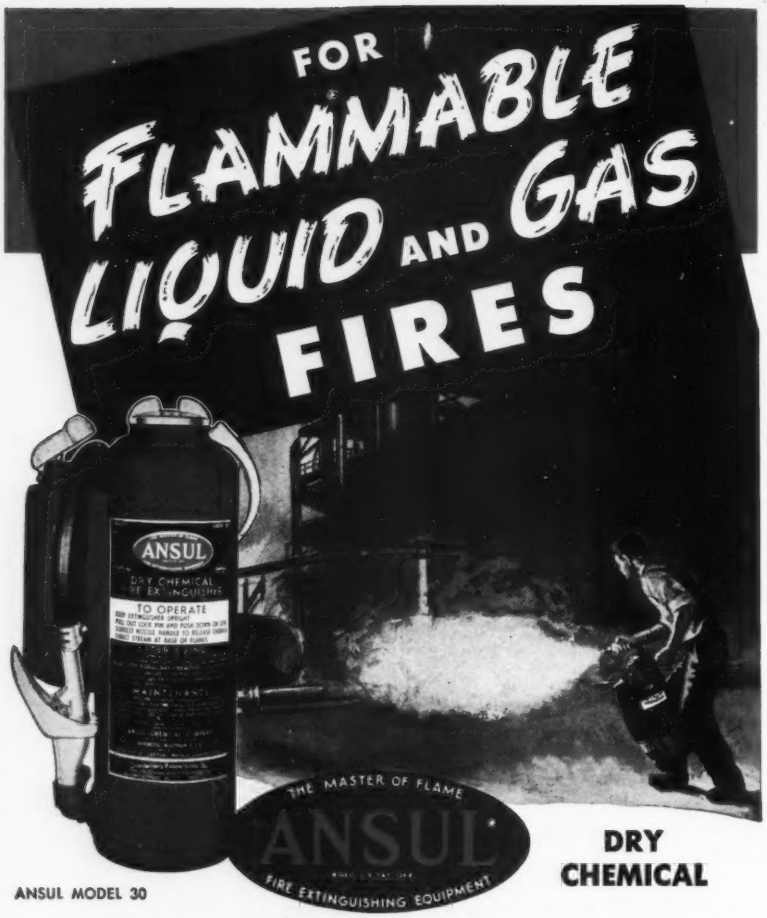

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(Continued from page 95)

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For operation, unstabilized straightrun gasoline and partially depropanized cracked gasoline were charged to the plancor feed-preparation unit and the debutanized straightrun and cracked gasolines, propane, and lighter fractions were returned to the refinery. Iso and normal butanes from the feed-preparation unit were charged to the alkylation unit along with a portion of butane-butylene cut from the feed-preparation unit. The remaining butane-butylene cut was sent to Neches Butane Products Co. Isobutane concentrate and isobutylene were returned from Neches to the alkylation plant. Aviation alkylate went to storage for later blending into gasoline, and the n-butane and propane were returned to the Pure Oil Co. refinery.

The salvage in place value was established at $855,000, but the plancor was sold to Pure Oil Co., the only bidder, for $630,000.

Plancor 718, Republic Oil & Refining Co., Texas City, Tex.—Consists of a fluid catalytic cracking unit with 12,000 bbl. per day virgin gas-oil charge-stock capacity; gas-concentration unit; HF alkylation unit; thermal reforming unit of 5,000 bbl. per day; virgin naphtha charge and gas-oil distillation unit with capacity of 11,000 bbl. per day of reduced crude. It was not a completely integrated refinery as it was dependent upon outside sources for the supply of reduced crude and gas oil as petroleum raw materials and upon outside thermal cracking facilities for the disposal of heavy cycle gas oil and heavy crude residuum. The capacity of the plant was approximately 3,600 bbl. per day of aviation gasoline. Two 12-in. pipe lines, each about 1½ miles long, extend from plancor to shipping docks, thus making water-borne transportation available for plant products by means of Galveston Ship Channel to the Gulf of Mexico.

This plancor was connected with Plancor 591, Southport, by a 3-in. pipe line for transfer of butanes, and with Plancor 1871, Pan American, by a 4-in. pipe line for transfer of pentanes and connected to the War Emergency Pipe Line through a Pan American Refining Corp. pumping station.

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This plancor was damaged as the result of an explosion of a ship load of ammonium nitrate at the dock in Texas City, but such damage was reported not to be of major proportions.

This property was sold to Republic for $2,300,000, and has been repaired and placed in operation for production of petroleum products.

Plancor 689, Root Petroleum Co., El Dorado, Ark.—Designed for production of 1,600 bbl. per day of aviation gasoline with equipment consisting of a 4,600-bbl.-per-day F.C.C. unit operating on gas-oil feed; a 1,300-bbl.-per-day alkylate from HF alkylation unit; 250-bbl.-per-day isobutane isomerization unit, Girbotol unit, boiler plant, water cooling buildings, and general facilities.

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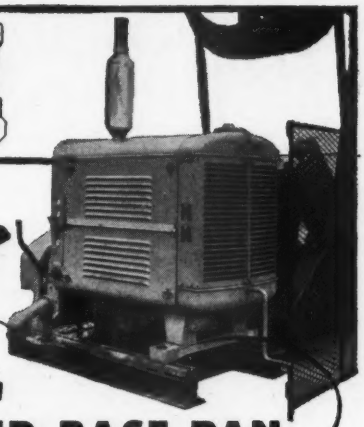

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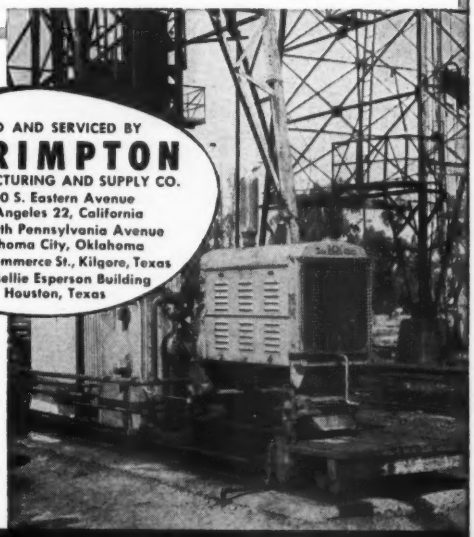

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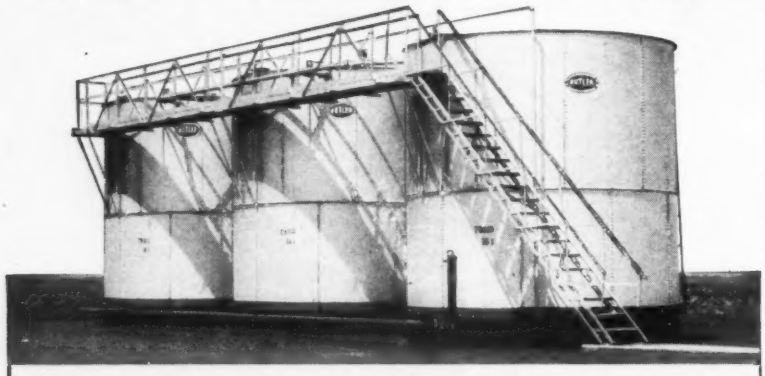

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refinery since it was dependent on the Root No. 1 plant for feed stocks and upon outside sources for raw materials.

The plant was designed by Universal Oil Products Co., and procedure for aviation-gasoline production followed recommendations by that company which includes HF alkylation and isomerization.

For peacetime use, it is not expected that the HF alkylation and isomerization units will be used for the designed purpose, but rather will be readapted. For example, the isomerization unit can be converted to a catalytic polymerization unit and due allowance was made in the establishment of fair value for expense required in making such readaptation.

This property was sold to Root for $1,100,000, and is now being used in conjunction with the Root No. 1 plant for production of petroleum products as required in the postwar period.

Plancor 591, Southport Petroleum Co., Texas City, Tex.—Built adjacent to the No. 1 plant of Southport Petroleum Co., whose name was later changed to American Liberty Oil Co., on July 1, 1945. Still later, the plant was sold to Sid Richardson. The plancor consisted of two major process units; a six-case Houdry catalytic cracking unit with integral gas-concentration unit with a capacity of 10,000 bbl. per day gas oil and an HF alkylation unit with capacity of 1,600 bbl. per day of alkylate.

For aviation gas, the Houdry catalytic cracking unit was supplied with reduced crude charge from the No. 1 refinery which was flashed in the Houdry tar separator to obtain the gas-oil charge to the six cases from which gasoline, No. 2 fuel oil, heavy cycle gas oil, butanes, butenes, gas, and coke were produced. The heavy cycle gas oil and residuum from the tar separator was processed to gasoline, Bunker C fuel oil, and gas in the thermal cracking unit. This gas and the gas from the crude-topping unit, together with butanes, butenes, and gas from catalytic cracking, were sent to the gas-concentration section of the catalytic cracking unit. The butane-butene (B-B) mixture was separated from the dry fuel gas and charged to the alkylation unit where the butene was alkylated with an equivalent amount of isobutane.

The gasoline from the crude-topping unit, thermal cracking, and catalytic cracking units was then blended with alkylate and butanes from the alkylation unit; then purchased butane was added to the refinery blend, in order to maintain the desired average vapor pressure.

The plancor was not an integrated refinery as it was lacking a crude-topping unit, a thermal cracking unit, and other auxiliary equipment.

For peacetime operation, the most profitable use would be for production of motor gasoline, kerosine, No. 2 fuel oil, and Bunker C fuel oil.

The plancor was sold to Petrol Terminal Corp. (now Petrol Refining, Inc.) for $3,250,000, and is now producing the petroleum products required for postwar requirements.

California Area Installations

Three West Coast plants, all located in California, were built adjacent to privately owned refineries from which the plancors received raw products for processing into 100-octane gasoline. Scarcity of California crude oil, danger from bombing by Japanese, and difficulties in shipment of the finished product, were factors that restricted the number of aviation-gasoline plants built in this area. Standard Oil Co. of California, Plancor 1833, had the largest capacity and cost $21,215,000, which sum was exceeded only by one other govern-

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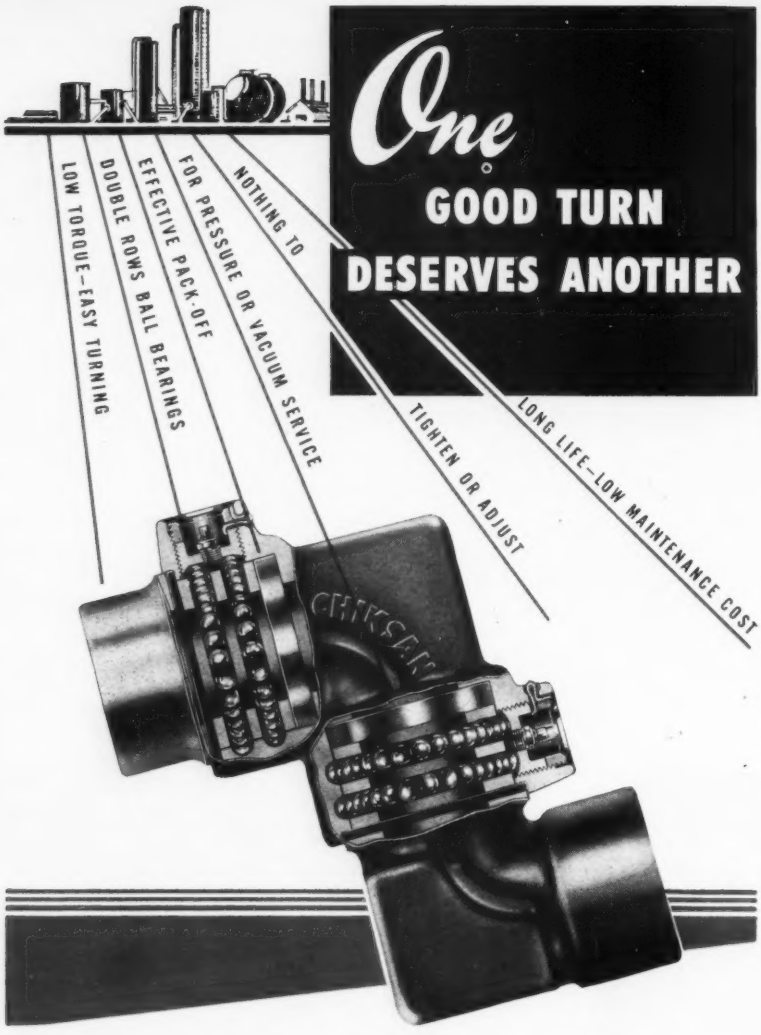

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ment plant, Abercrombie-Harrison, in Texas. Mohawk Petroleum Corp., Plancor 1041, and Wilshire, Plancor 912, were the other two plants constructed on the West Coast for 100-octane aviation-gasoline production by the Government.

Plancor 1833, Standard Oil Co. of California, Richmond, Calif.—Was built adjacent to the No. 1 plant of Standard, which has a crude-oil charging capacity of 132,000 bbl. per calendar day. The plancor facilities for production of aviation gasoline consist of the following major units; twin reactor thermofor catalytic cracking unit, gas recovery, HF alkylation, isomerization, C_4-C_5 distillation, steam power plant, salt-water cooling, and electrical system, together with building, improvements, and auxiliary equipment. The main plant site was an area formed partly by excavating 350,000 cu. yd. of earth from a hillside, and partly by earth fill. Part of foundations rest on virgin soil with the remaining resting on piles.

For aviation gasoline, the plancor's production is sufficient, when blended with proper proportions of straightrun aviation base stock and high-octane blending stocks and tetraethyl lead to make 17,000-20,000 bbl. per calendar day of 100-octane gasoline.

For peacetime production of motor gasoline, the isomerization and C_4-C_5 distillation units would not be required. However, these facilities may be readapted to the newer techniques of petrochemistry currently coming to the fore.

The T.C.C. unit had a twin reactor with one section for gas-oil cracking and the other section for retreat cracking. It is protected throughout against corrosion by alloy and alloy linings, and the regenerating kilns are of the solid-bed type. It had a design rate of 14,000 bbl. per day of charging capacity (fresh feed plus recycle feed) for each section (28,000 bbl. per day total). At various times in operation during the war emergency, it has been possible to operate each section with a total capacity of approximately 20,000 bbl. per day consisting of fresh and recycle feed, or 40,000 bbl. total.

In establishment of fair value for this plant, allowance was made for oversize capacity on the basis of peacetime use. The plancor was sold to Standard Oil Co. of California for $6,000,000.

Plancor 1041, Mohawk Petroleum Corp., Bakersfield, Calif.—Was completed and placed in operation in February 1944, and closed down late in August 1945. Its production capacity in terms of 88-92-octane products was approximately 1,200 bbl. per day which was sufficient when blended with proper proportions of straight-run aviation base stock, additional isopentane, cumene, and tetraethyl lead (all from outside sources) to produce 2,160 bbl. per day of 100-octane gasoline. The facilities comprised: Thermal reformer, gas concentration, alkylation, isomerization, isopentane splitter, utilities, and general auxiliaries.

The plant is modern and well constructed. It has not been sold and is now being operated under a leasing agreement by Standard of California. The lease runs until June 1949, and covers approximately 30 per cent of the facilities for a special petrochemical operation.

Plancor 912, Wilshire Oil Co., Inc., Norwalk, Calif.—Comprised fluid catalytic cracking, gas-concentration, alkylation, and isomerization units, together with general facilities. It was built adjacent to Wilshire No. 1, privately owned plant, and had some facilities, notably boiler house, turbo-generator house, and some storage tanks located on the private property through a leasing agreement. It was not an integrated refinery, as it depended on Wilshire for crude topping, thermal cracking, reforming, and catalytic polymerization. Since the war, the two 125,000-lb.-steam-per-hour boilers and accessories were sold to Wilshire, and the plancor is therefore without steam facilities for processing and for op-

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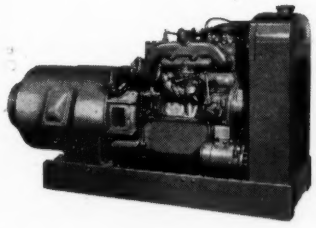

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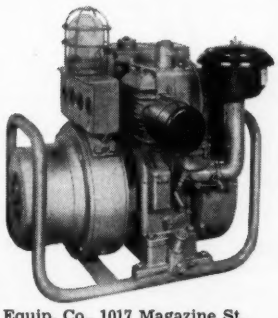

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eration of turbogenerators for electricity. However, the plant motors are designed for 60-cycle current and electricity could be purchased from outside sources.

During wartime operation, the plancor produced an average of 4,700 bbl. per day of 100-octane aviation gasoline by blending its products with outside stocks of straight-run base stocks, isopentane, cumene, and tetraethyl lead. The operating costs were not excessively high for this sized plant and type of operation.

This plancor has not been sold and due to the commingling of plancor facilities with those of the private Wilshire Oil Co., it may be necessary to cannibalize the property and to sell the equipment for offsite use.

Various Other Facilities

Plancor 1909, Humble Oil & Refining Co., Baytown, Tex., was designed for hydrogenation of 13,000 bbl. per day charge stock, and was constructed under a special agreement involving subsequent removal of certain facilities and purchase of others, by Humble. Champlin Refining Co., Enid, Okla., and Cities Service Oil Co., East Chicago, Ill., were built under Office of Defense Supplies (RFC) escrow contracts, as were two smaller plants: Continental Oil Co., isopentane plant, Wichita Falls, Tex., and Socony-Vacuum Oil Co., Inc., B-B extraction unit at East St. Louis, Ill.

Rough Route Traversed By 24-In. T. G. T. Loop

(Continued from page 98)

exception of 15 factory bends which had been furnished at points where it had been anticipated that bends would be too sharp to be conveniently made by wrinkle bending. Only a few gulleys were crossed by spans. The large amount of bending in certain places is indicated by data on two sections cited as examples to show deviations from a straight line along the route: (1) 6,500 ft. straight line, 8,966 ft. route; (2) 9,500 ft. straight line, 13,200 ft. route.

Welding

The two spreads used 25 welding machines each. The stringer beads were made with No. 5 rod, the filler bead with No. 85, and the finish bead usually with No. 5 but sometimes with 85 rod. Strip beads were run where required in the judgment of welding foreman or inspector. Under certain conditions where reinforcing was desirable in rough places on the right-of-way, two welders ran filler beads directly behind the stringer bead welders. Each spread had 6 to 10 bell-hole welders. X-ray inspection of welding was used in accordance with T.G.T. practice.

Coating and Wrapping

Conforming with the usual practice in West Virginia, the original 20-in. line of Tennesse Gas Transmission was laid bare. All of the 85-mile, 24-in. loop laid by Oklahoma Contracting was coated and wrapped. Overland sections had a coating of coal-tar enamel and a glass-mat wrap. Another type of coating and wrapping was provided for certain spots where it had been anticipated that hand methods would be needed. This type was used on about 15 miles on the last end in extremely rough terrain. Both the large 30-bbl. and the smaller 4 and 10-bbl. pots were used for heating coating material.

A special type of backfiller handled by one operator was built by the Oklahoma Contracting organization for this West Virginia work. This was equipped with dragline drums. Steering clutches and brakes are pneumatically operated by connection with the power takeoff.

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THE MOTHER LODE COUNTRY. Geologic Guidebook Along Highway 49—Sierran Gold Belt. Bulletin 141. Prepared under direction of Olaf P. Jenkins. Published by Department of Natural Resources, Division of Mines, State of California, Ferry Building, San Francisco.

This volume contains a series of geologic maps covering the entire highway, a strip of country 277 miles in length. Numerous photographs and other illustrations accompany the articles which make up the bulletin. The book represents the centennial edition of the Division of Mines. Information has been compiled from various published and unpublished sources, supplemented by notes taken during field investigations carried on particularly for this volume. The book is a semitechnical treatise prepared to serve as a guide to the traveler who is desirous of information concerning the mines, minerals, and rocks of the region, as well as the old structures created during the gold-rush days.

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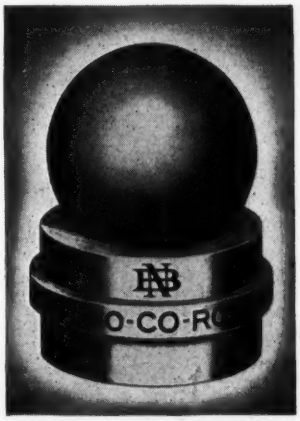

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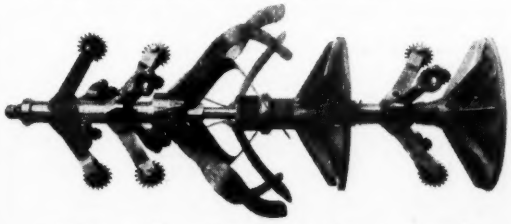

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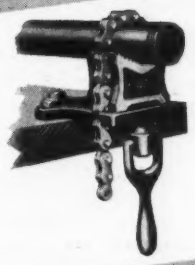

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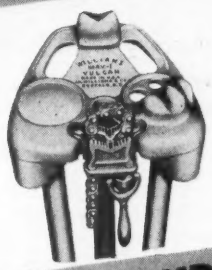

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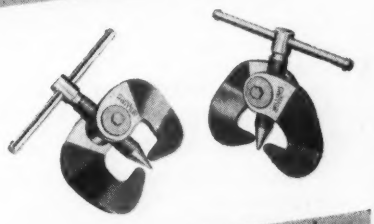

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QUESTIONS on TECHNOLOGY

by W. L. Nelson

Consulting Engineer

Salt Deposits on Cooling Tower Nozzles

The nozzles on our cooling tower are encrusted with a deposit of salt that must be removed by hand. What can be done about this? R. P. M.

According to D. P. Dukelow (Chemical Engineering, November 1948, page 155) this situation can be cured by passing a small amount of water over the outside of the nozzle. He reported a case in which a brine was being sprayed that caused a deposit of salt on the outside of the nozzles to the extent that flow was practically stopped. The encrustation had to be removed periodically by hand by a man going up the tower at intervals of 2 or 3 hours to tend each nozzle.

A very small amount of fresh water was bypassed over the outside of the nozzle. A simple way to accomplish this is to run a ¼-in. pipe to a point about ¼ in. above each nozzle.

Machinery Cost Indexes

In connection with your October 21 article on Cost Indexes, can you give us more on the cost of machinery?—D. D.

About the best indexes on machinery costs are those of the U. S. Department of Labor, Bureau of Labor Statistics, in their yearly bulletin entitled, "Wholesale Prices." Index numbers of prices of general and auxiliary machinery and equipment are published quarterly, but they only extend back to 1939. This is the basic source of the Machinery, Pumps and Compressor, Instrument, and Heat-Exchanger indexes shown in Costimating No. 1 of October 21, 1948, page 141. Table 1 shows the index numbers for the 16 general classes of machinery. Some machinery costs are also available in the monthly Survey of Current Business of the U. S. Department of Commerce, as well as the costs of some raw materials and current wage rates.

Little is available before 1939 except scattered information in the Statistical Abstracts of the United States, published yearly by the U. S. Department of Commerce.

Table 1 (Bureau of Labor Statistics) is based on 143 items of equipment grouped into 16 divisions. Several of the groups do not seem to be directly applicable to refinery or construction, notably groups 4, 9, 12, and 14, pertaining to material handling, industrial stokers, lubrication, and heat-treating furnaces.

Hydrofluoric Acid For Desulfurization

What are the methods of removing sulfur from gasoline? We have a distillate that contains 0.37 per cent sulfur and have difficulty in getting the sulfur down to 0.1 per cent.—G. M. C.

The fact of the matter is that we have no adequate means of removing the large amounts of sulfur that are not removed by catalytic desulfurization or the sweetening treatments. Sulfuric acid has long been used for the purpose but any sizable reduction of sulfur content usually causes such a large treating loss that the process is scarcely economical. In addition, the distillate must usually be redistilled with steam after the acid treatment, and this is an expensive operation compared with the chemical treatments employed by other refiners in the treating of low-sulfur gasolines. When sulfuric acid is employed, the acid concentration should be high (93 per cent or stronger), the temperature should be low (25°-50° F.), the amount of acid required is usually large, and the time of contact must be carefully regulated so that an optimum balance between treating loss and sulfur reduction is attained.

Although this department of The Oil and Gas Journal is not authoritative with regard to chemistry or even petroleum treating, attention is called to the increasing inferences that hydrofluoric acid is a desulfurizing agent. Randal Maass in his, "The Fractionation of Hydrofluoric Acid..." (Pet. Engineer, February 1945, page 194) states, "It is becoming increasingly evident that HF has great desulfurizing powers. Consequently, to prevent this contamination, the feed stock is prepared as an overhead product leaving the elemental sulfur in the column bottoms."

Schneider and Feichtinger (Desulfurization of Gasoline, Angewante Chemie B 20, 12-16, 1948, German), have developed a process employing 98 per cent hydrofluoric acid as a solvent for the sulfur in gasoline. This acid, compared with sulfuric acid, causes smaller treating losses, the desulfurization is better, the acid can be removed by distillation, and the acid sludge or residue is said to be a useful product.

A. L. Foster (Anhydrous HF—Tomorrow's Refining Process Catalyst, *The Oil and Gas Journal, January 7, 1943, page 125)* states that hydrofluoric acid usually does not go into any type of permanent or primary combination with the reacting materials except as minor products such as alkyl fluorides. Such fluorides and addition products are generally decomposed by heat or treatment with acids, alkalies, etc.

Finally, J. H. Simons (Potential Uses of Hydrogen Fluoride in Organic Chemical Processes, Ind. Eng. Chem., 32, 178, February 1940) points out that HF cannot react in a manner similar to sulfonation because it contains no oxygen. Sulfuric acid has a great tendency to sulfonate organic substances, particularly the aromatics, and undesired sulfonated residues are formed.

TABLE 1—INDEX NUMBERS OF 16 CLASSES OF GENERAL MACHINERY AND EQUIPMENT (AUGUST 1939 = 100)

Equipment class—	1939	1940	1941	1942	1943	1944	1945	1946	Jan. 1947
Over-all composite	100.1	100 3	102.6	104.3	103.1	102.5	102.4	111.4	122.3
1. Compressors	100.0	100.1	100.4	100.5	100.4	100.4	100.4	107.7	117.8
2. Pumps	100.3	98.9	101.2	103.4	103.4	103.3	103.3	110.8	126.0
3. Industrial instruments	100.0	100.0	101.3	100.9	100.5	100.1	100.1	110.8	119.0
4. Material handling	100.1	100.9	103.3	103.8	103.6	103.6	103.7	112.1	121.3
5. Fans, blowers	100.7	99.9	108.4	111.2	110.8	110.9	110.9	117.8	136.5
6. Heat exchangers	100.0	102.7	117.0	130.9	131.3	124.3	119.4	131.5	144.7
7. Power transmission	100.1	100.3	101.4	101.9	98.6	97.8	97.9	105.9	118.6
8. Engines	100.0	100.1	102.6	106.1	106.1	107.2	107.3	117.8	126.5
9. Industrial stokers	100.0	101.7	103.2	104.3	103.8	103.5	103.5	119.4	140.6
10. Industrial oil burners	100.0	100.0	101.2	103.0	103.0	103.0	103.0	112.3	124.6
11. Welding, cutting	100.0	100.0	100.0	100.0	100.0	100.0	99.9	104.0	107.8
12. Lubrication	100.0	100.0	99.6	99.4	99.4	99.4	100.1	108.9	118.2
13. Industrial scales	100.0	100.1	104.6	107.6	107.6	107.6	107.6	124.9	135.7
14. Heat treating furnaces	100.0	100.0	101.2	103.0	103.0	101.5	101.4	110.7	116.9
15. Cutting tools	100.0	100.0	100.2	100.4	100.2	100.0	100.0	111.0	117.3
16. Mechanical testing equipment	100.0	100.9	105.7	109.6	108.9	109.1	109.2	118.0	123.9

XUM

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1. **MEETS EVERY CONDITION.** Guns fired either electrically or mechanically: guns run on cable, sand line, drill pipe, tubing, or on piano-wire measuring line in extremely high-pressure wells.
2. **SIMULTANEOUS FIRING** under all conditions gives exact spacing of shots, perfect perforation pattern, and saves down-the-hole time.
3. **ACCURATE DEPTH MEASUREMENTS** put the shots right where you order them.
4. **MAXIMUM PENETRATION** of bullets into the formation, as proved repeatedly in competitive field tests.
5. **GUNS TO FIT EVERY CONDITION.** McCullough employs more than 30 different types and sizes of guns.
6. **ALL SIZES OF BULLETS** from $\frac{1}{16}$" dia. up to $\frac{3}{4}$" dia., to fit every possible need.
7. **BURRLESS BULLETS,** giving a completely burr-free hole, eliminating casing scraping, with *no* sacrifice of penetration.
8. **NO LOST TIME.** McCullough's simpler, lighter equipment cuts setting-up and moving-out time, speeds up every job.
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ENGINEERING *fundamentals*

Estimation of Formation Volume Factors From Well Gradients

THE formation volume factor, designated by β, is defined as the reservoir volume occupied by 1 bbl. of stock-tank oil plus its attendant gas under reservoir conditions of pressure and temperature. Among the methods for estimating this factor when a direct laboratory measurement is not available is that by means of the pressure gradient measured within the liquid phase in the well bore.

To make this estimation one needs to compute the space occupied by the liquid at its subsurface conditions. By definition, the density of a liquid is the mass of a definite volume of the liquid divided by that volume.

$$\rho_L = \frac{M_L}{V_L} \qquad (1)$$

The density of a liquid also determines the pressure gradient with depth within the static liquid column in the well bore. This relationship is:

$$P_2 - P_1 = \rho_L (h_2 - h_1) \qquad (2)$$

where the density is in weight units and provided the density is constant between the points of depth h_1 and h_2. If the density is variable then the density is given by a differential quantity:

$$\frac{dP}{dh} = \rho_L \qquad (3)$$

Combining Equations 1 and 3 yields the condition that:

$$\frac{dP}{dh} = \frac{M_L}{V_L} \qquad (4)$$

Therefore, the subsurface volume of a given mass of liquid at a given point of depth can be obtained from the gradient at that point of depth. If the mass of liquid taken is equivalent to that of 1 bbl. of stock-tank oil then the subsurface volume found is the formation volume factor at that point.

In dealing with gradients in commonly measured units of pounds per square inch per foot of depth and production in barrels, the units of Equation 4 must be changed to produce agreement. Hence, it should read:

$$144 \frac{dP}{dh} = \frac{M_L}{5.6\, V_L}$$

where dP/dh is in pounds per square inch per foot, V_L is in barrels, and M_L is in pounds weight.

The barrel of liquid at the depth at which the pressure gradient is measured is made up of less than 1 bbl. of stock-tank oil, the shrinkage in volume being due to the gas which is evolved from solution. Stating this in reverse, the stock-tank oil plus the gas that will go into solution at the pressure being considered will occupy more than a barrel of volume. If the mass of 1 bbl. of stock-tank oil and gas in solution is known, it can be divided by the density at subsurface conditions to give the subsurface liquid volume. The subsurface liquid volume in turn can be divided by the surface volume (taken as 1 bbl.) to give the factor sought. In the form of an equation, expanded from (4) above, this is:

$$\beta \text{ at depth } h = \frac{\text{wt. of 1 bbl. s.t. oil + wt. gas in solution at depth } h}{(5.6)\,(144)\, dP/dh \text{ at depth } h}$$

The weight of a barrel of stock-tank oil is directly ascertainable and the value of dP/dh can be read from a chart of depth versus pressure. The weight of gas in solution cannot be computed without knowing the volume of gas in solution. This is the least reliable estimate, but it can be in error by a fair amount without producing a large percentage change in β. It can be taken to be the producing gas-oil ratio as a first approximation. However, because the pressure under consideration at depth h will generally be lower than the formation pressure which held the entire amount of gas in solution, a quantity less than the produced gas-oil ratio may be a more appropriate estimate.

Consider as an example a well which is producing oil of 40° A.P.I. gravity along with a gas of 0.850 specific gravity. The weight in pounds per gallon for this gravity oil is 6.87, and the weight per barrel of stock-tank oil is, therefore, (42) (6.87) = 289 lb. The static pressure profile shows a gradient of 0.320 psi. per foot at a depth where the pressure is 2,000 psi. At this pressure the gas in solution is estimated as 500 standard cubic feet per barrel of stock-tank oil. The weight of this volume of gas is (500/379) (0.850) (28.96) = 32.5 lb. Therefore, using the equation last given, the value of β will be:

$$\beta = \frac{289 + 32.5}{(5.6)\,(144)\,(0.320)} = 1.24$$

DR. CALHOUN

This series on Reservoir Mechanics is being used as a text in a number of petroleum-engineering schools. The first 46 installments are available in a reprint booklet "Advanced Reservoir Engineering" at $1.00 per copy, for convenience of Journal subscribers who may have missed some of the earlier units commencing with No. 300 (start of subject). Other available technical reference manuals are "Oil Well Pumping Methods," "Electric Logging," "Modern Rotary Drilling," and "Modern Refining Processes" at $1.00 each. Address Reader Service Department, The Oil and Gas Journal, P. O. Box 1260, Tulsa.

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Cost-imating

A WEEKLY FEATURE OF THE OIL ANG GAS JOURNAL

Ladders, Walkways, and Platforms

COST-IMATING INSTALLMENTS PERTAINING TO TANKS AND VESSELS

No. 3—November 4, 1948—Construction Steel.—Shows per pound costs of cylindrical steel vessels without connections, and per pound costs of A.P.I. flat-bottom cone-roof fabricated and erected tanks.

No. 5—November 18, 1948—Storage Tanks.—Costs per unit volume (barrels or gallons) of cone-roof and A.P.I. standard tanks, and spherical tanks.

No. 6—November 25, 1948—Petrochemical and Small Tanks.—Costs of bolted and redwood oil-field stock tanks; refinery rundown tanks; wood tanks; chemical tanks (on legs) of plain steel, rubber lined, stainless steel, and glass lined; and chemical tanks (cone roof) of Monel, stainless, Monel-clad, Inconel-clad, nickel-clad and stainless-clad.

No. 9—December 16, 1948—Vessels.—Unit costs of steel, connections, and erection. Weights of cylindrical shells and heads. Costs (each) of installed flanged or manhole connections and couplings.

No. 10—December 23, 1948—Special Vessels.—Example of the cost of a vessel. Costs of erection and special materials, such as Monel, nickel, aluminum, and numerous cladding materials. Costs of alloy linings, gunite and metallizing.

APPROXIMATE COST INDEXES
1946 = 100

	Structural steel*	Refinery labor†	Material and labor‡
1924	94	60	86
1926	84	58	77
1928	80	57	75
1929	83	59	77
1930	73	57	69
1931	70	57	67
1932	68	48	63
1933	72	49	66
1934	77	55	71
1935	78	58	73
1936	80	60	75
1937	95	65	87
1938	93	67	86
1939	91	68	85
1940	90	69	85
1941	91	71	86
1942	90	79	88
1943	91	87	90
1944	90	90	90
1945	91	94	93
1946	100	100	100
1947	117	119	117
1948 (est.)	140	154	144

*U. S. Department of Commerce, Statistical Abstract of the U. S., 1947. †Cost-imating No. 1, October 21, 1948. ‡Twenty-five per cent labor.

ALTHOUGH these items do not constitute a large percentage of the total cost of a plant, they are troublesome to cost estimators because so many small items are involved and because most estimators are process rather than structural engineers. Happel, Aries, and Borns[1] state that the total structural steel in chemical plants amounts to 2-10 per cent of the major equipment cost, or about[2] 0.5-3.0 per cent of the direct plant cost. The cost of steel structures will be discussed in another installment of Cost-imating.

Towers, Platforms, Weights,[6] and Costs (1946)

Diameter of tower, ft.—	Weight (lb.)	Cost,* dollars each
2-ft. 6-in.	1,250	150-228
3	1,400	168-266
4	1,750	193-324
5	2,150	226-387
6	2,450	269-440
7	2,750	302-480
8	3,000	325-525
9	3,250	340-553
10	3,500	365-580
11	3,700	370-595
12†	†3,900	390-605
13†	†4,100	410-615

*Steel prices shown on this page. †Extrapolated from Brown & Fowler data.[5]

References

1. Happel, Aries, & Borns, Equipment Costs and Other Items. . . ., Chem. Eng., Dec. 1946, p. 97.
2. Nelson, W. L., Summary Sheets for Cost Estimates, The Oil and Gas Journal, Dec. 8, 1948, p. 117.
3. Happel, Aries, & Borns, Equipment Costs, Chem. Eng., Oct. 1946, p. 99.
4. Bliss, H., Data for Equipment Cost Estimates, Chem. Eng., May 1947, p. 126.
5. Fowler & Brown, Cost of Pressure Vessels and Pressure Fractionating Columns, A.I.Ch.E., 30, 241 (1943).

STEEL AND LUMBER COSTS—HANDRAILS, PLATFORMS, LADDERS, ETC. (1946)

	Unit	M	L	M & L
Structural steel, small parts[6]	ct./lb.	8-13	2-6	10-19
Handrail pipe and fittings[2 3 4]	ct./lb.	8-12	2-6	10-18
Platforms and walkway[2 3 4]	ct./lb.	8-10	4-8	12-18
Jib and overhead cranes, complete with hangers, hand gears, and bearings on jib cranes[3]	ct./lb.	14-18	2-4	16-22
Lumber (scaffolding):				
Towers or above 20 ft.	$/M.f.b.m.	113	85	197
Stills or below 20 ft.	$/M.f.b.m.	85-94	93-102	178-196

COST OF FLOOR OR PLATFORM GRATING (1946)[2]

	Unit	M	L	M & L
Large platforms	$/sq. ft.	.61-.80	.17	.78-.97
Walkways	$/sq. ft.	.85-.91	.17-.20	1.02-1.11
Stairs or small	$/sq. ft.	.91-1.22	.17-.25	1.08-1.47
Stair treads, 30-in.	$ each	2.25-2.74	.35-.45	2.60-3.19

COST AND WEIGHT OF LADDERS, STAIRWAYS, WALKWAYS, ETC. (1946)

	Weight (lb./ft.)	Cost* ($/ft.)
Handrail, pipe—2 rails with posts at 5-8 ft.[2] on concrete	7-10	0.70-1.80
Handrail, structural[2 5]	8-11	0.80-2.09
Walkways, 2 sides and grating, 30-in.[3]	70-100	8.40-18.00
Walkways, on side of pipe still, 48-in.[3]	55-70	6.60-12.60
Stairways with rails and treads[1]	150-250	18.00-45.00
Ladders, 3 slat, no supports[2]	16-20	1.60-3.80
Ladders, 3 slat, incl. supports	30[5]-50[1]	3.00-9.50

*Based on the prices shown on this page for steel and grating.

No. 18 in a series by W. L. Nelson, professor of petroleum refinery engineering, University of Tulsa

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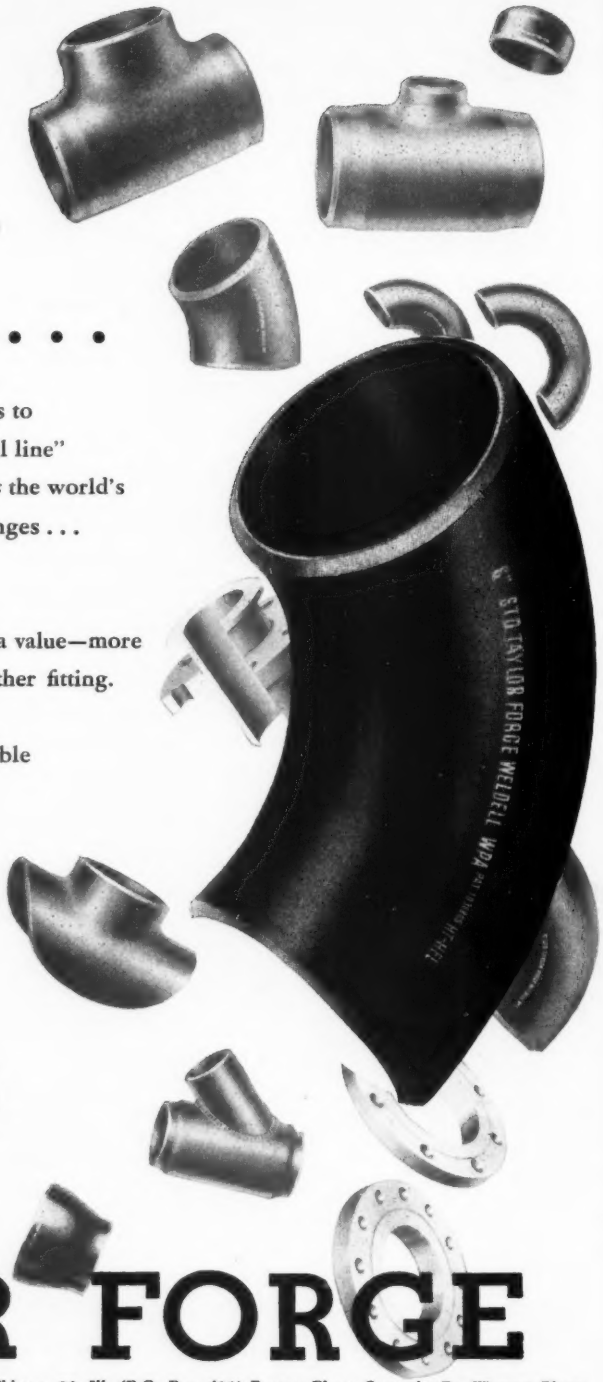

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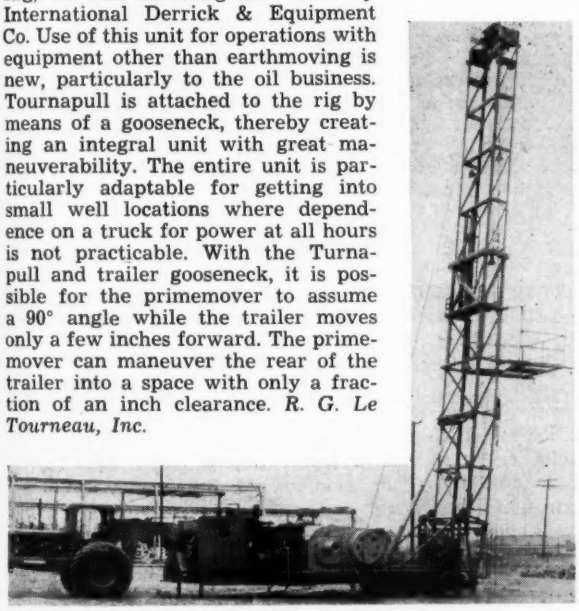
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

by Dan B. Miller

(1) LE TOURNEAU TOURNAPULL has been incorporated into the design of the Rambler Rig, oil-well servicing unit built by International Derrick & Equipment Co. Use of this unit for operations with equipment other than earthmoving is new, particularly to the oil business. Tournapull is attached to the rig by means of a gooseneck, thereby creating an integral unit with great maneuverability. The entire unit is particularly adaptable for getting into small well locations where dependence on a truck for power at all hours is not practicable. With the Turnapull and trailer gooseneck, it is possible for the primemover to assume a 90° angle while the trailer moves only a few inches forward. The primemover can maneuver the rear of the trailer into a space with only a fraction of an inch clearance. *R. G. Le Tourneau, Inc.*

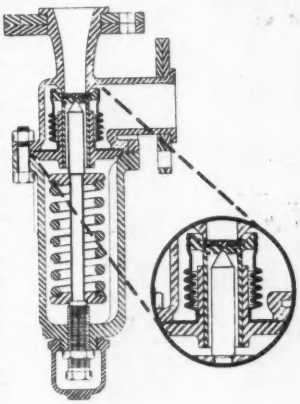


IT'S NEW CHECK IT

(2) WORDEN PORTABLE GRAVITY METER is built specifically for work in humid climates. The meter has no thermostat, is well insulated and compensated for all temperature changes encountered in jungle or mountainous work. It requires no outside power supply, relays, or sensitive electrical system. It can be carried as far and as fast in rugged country as a man can walk without a load. Meters are available either for sale, rent, or special rental-purchase plan. *Houston Technical Laboratory.*

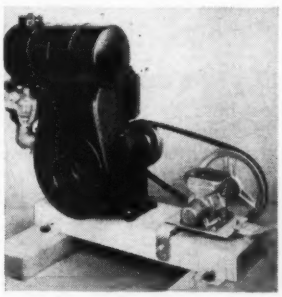
IT'S NEW CHECK IT

(3) FARRISEAL BELLOWS SAFETY VALVE completely isolates the lading fluid from the valve-spring chamber and guide surfaces. The guide cannot become fouled under any conditions, and corrosion becomes completely minimized. It is of particular advantage in connection with back-pressure surge applications. With the FarriSeal bellows in such applications, complete graphs are set up allowing the user to predetermine the point at which the valve is to be set in order to eliminate the error of back-pressure surge. The FarriSeal bellows is an enveloping bellows made in type 316 stainless steel as a standard, and is also available in rubber and neoprene for the chemical and corrosive-resistant type valves particularly. The bellows is constructed as to allow the safety valve its full stroke plus overtravel, and at the same time never reach the stress limits of the bellows itself. *Farris Engineering Corp.*



IT'S NEW CHECK IT

(4) PORTABLE PUMP UNIT. This new unit consists of a gearless pump, powered by a 1½-hp., single-cylinder, four-cycle, air-cooled gasoline engine. It is designed for use on boats and docks, in plants, or wherever a portable-type emergency pump is required. This unit can be used as a shallow-well pump, for low-pressure spraying. In plants, it can also be used for sump cleaning. Its general utility and portability lend themselves to these and many other uses. Total weight of the unit is 51 lb.



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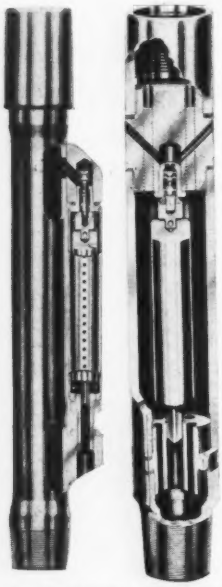
Dimensions are approximately 18 in. high by 18 in. long by 15 in. wide. *Eco Engineering Co.*

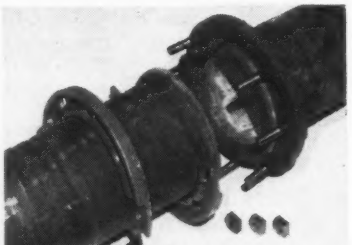


IT'S NEW CHECK IT

(5) NIXON "WEIGHT LOADED" GAS LIFT FLOW VALVES for tubing flow and casing flow, producing medium and high fluid wells has no springs or parts which fatigue and cause shutdown time in production. The opening and closing actions of the valves are controlled by a solid steel weight attached to a small loose-fitting piston. Once set, the valve remains in calibration throughout its life as the temperature changes. There are three wearing parts to the valve. These parts can be replaced by operator and do not require returning to shop for reworking or pressure-chamber testing. *Wilson Supply Co.*

IT'S NEW CHECK IT

(6) BARGE-LOADING OIL HOSE designated as Types 725, 525, and 325 are equipped with Flexseal ends and split flanges. Development of the new line of barge-loading hose was brought about by the endeavor to attain more speed in connecting and disconnecting hose lines so that the tie-up time of the barge will be appreciably lessened. Large reductions in weight and much greater flexibility and ease of handling are accomplished. Handling of a long section of the largest diameters in the new hose by two men, and making the couplings fast by one man without turning, tugging, or twisting are among important advantages. No gaskets are required and the elimination of conventional heavy nipples and flanges brings tremendous savings in weight and allows the hose to be flexible from flange to flange. *B. F. Goodrich Co.*

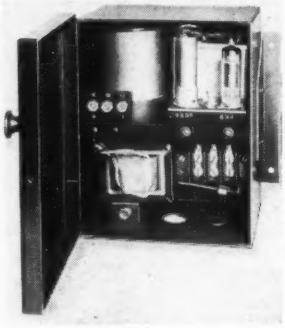


IT'S NEW CHECK IT

(7) RESEARCH QUANTITIES OF HEXADECENE, a moderately priced olefin raw material which has interesting possibilities in organic synthesis, are available. Besides its utilization in numerous olefin reactions, hexadecene should be of interest because of some of its physical properties which are: boiling point, 242° C.; pour point, less than —50° C.; flash point, 90° C.; viscosity, at 38° C., 3.57 centistokes, at 54° C., 2.57 centistokes, at 99° C., 1.33 centistokes. *Houdry Process Corp.*

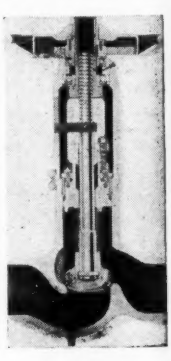
IT'S NEW CHECK IT

(8) ELECTRO-PNEUMATIC TRANSDUCER. The microsen pneumatic transmitter measures direct current in terms of air pressure. The pneumatic output is linearly proportional to the d.-c. input. The instrument is useful as a transmitter for remote indication or recording and can also serve as a transducer for control operations. It is suitable for sensitive electrical measurements of resistance, millivolts, microamperes as required for temperature, strain, speed, battery charging, radiation, light, vacuum, and humidity. The pneumatic output is useful for remote transmission, recording, or control operation. It is especially applicable as the output element of electronic process-control apparatus or where, for reasons of hazard or availability of equipment, pneumatic operation is desirable. It is designed for 110 or 220 volt a.c. power and 18-22 psi. pressure supplies. Operation is not affected by variations in line voltage or supply pressure. *Manning, Maxwell & Moore, Inc.*



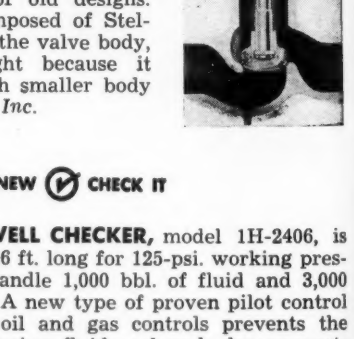
IT'S NEW CHECK IT

(9) NEW DESIGN FOR CAST-STEEL VALVES makes it possible to economize, by installing a size smaller valve in pipe lines. Stop and nonreturn valves in either the globe or angle design use the new body for all 6-in. sizes and above in 900, 1,500, and 2,500-lb. classes. They are available with pressure seal or bolted bonnet and with flanged or welded ends. In some sizes the new design reduces the weight of valves to less than 50 per cent of the weight of old designs. The integral seat, composed of Stellite laid directly upon the valve body, greatly reduces weight because it makes possible a much smaller body bore. *Edward Valves, Inc.*



IT'S NEW CHECK IT

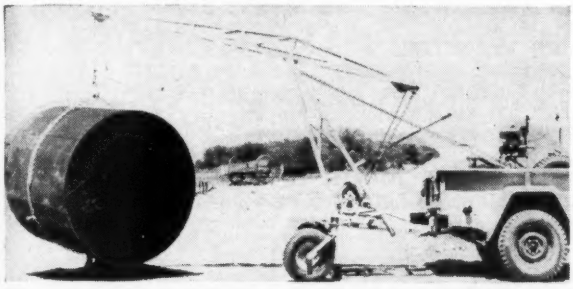
(10) HORIZONTAL WELL CHECKER, model 1H-2406, is 24 in. in diameter and 6 ft. long for 125-psi. working pressure. This unit will handle 1,000 bbl. of fluid and 3,000 M.c.f. of gas per day. A new type of proven pilot control which operates both oil and gas controls prevents the separator from ever losing fluid seal and also prevents fluid from spilling over into gas run. This pilot will operate satisfactorily on either a fluid or gas supply medium. Packing glands and stuffing boxes have been eliminated completely in the pilot and also in the control valves, as well as a pressure-reducing regulator. The horizontal separator has a series of perforated baffles and a special



b.s. and w. baffle to hold water, sand, or other foreign matter out of the clean-oil outlet compartment, which is advantageous in oil metering. Units may also be furnished with automatic water knockouts when required. Permanent units will be available to handle up to 42,000 bbl. per day and 50,000 M.c.f., pressures up to 1,500 psi. *Rolo Manufacturing Co.*

IT'S NEW CHECK IT

(11) HANDI-HOIST for lifting, loading, unloading, or moving of bulky heavy equipment, employs methods of



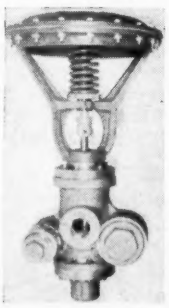
counterbalancing, utilizing the weight of the towing vehicle. Cradle-boom construction permits handling of loads up to 3 tons. Simple coupling to tractor or jeep power takeoffs cuts attaching or removing time to relatively few minutes. Unit can be furnished with various types of booms. *Construction Machinery Co.*

IT'S NEW CHECK IT

(12) ELECTRONIC CONTROL FOR DEEP-WELL DRILLING. A new automatic electronic control which provides exact weight for a drill bit as it penetrates oil-bearing formations thousands of feet below the surface was developed cooperatively by companies in the oil and refining industries, drilling-equipment makers, and industrial-instrument engineers. Makes use of a strain gage assembly, electronic potentiometer which operates as a weight indicator on the drilling bit, and a pneumatic brake which maintains the desired weight. *Brown Instrument Division Minneapolis-Honeywell Regulator Co.*

IT'S NEW CHECK IT

(13) DIAPHRAGM-ACTUATED TWO-PRESSURE MERIT VALVES are now available for a wide range of application in high-pressure hydraulic service. The valves range in size from 1 to 4 in., and can be furnished for operation on systems having pressure of 3,000, 5,000, and 10,000 psi. Valves provide for shockless operation, rapid servicing, minimum frictional loss, and ready accessibility to all working parts. Variations of valve assembly provide for diaphragm-controlled high-pressure inlet, diaphragm-controlled slow-travel valve or diaphragm-controlled stop valve, all handled within one casting. *Emmett Machine & Manufacturing, Inc.*



IT'S NEW CHECK IT

(14) HASTELLOY AND MULTIMET ALLOY DRAWN WIRE, for welding, metal spraying, and manufacture of wire screen, wire cloth, and springs, is now available in diameters down to 0.060 in. Wire is furnished in coils or in cut and straightened lengths, either bare or flux coated. Hastelloy alloys are high-strength, nickel-base alloys, that were developed to resist severe chemical corrosion. They withstand the action of the common mineral acids such as hydrochloric and sulfuric, over a wide range of temperatures and concentrations. *Haynes Stellite Co.*

IT'S NEW CHECK IT

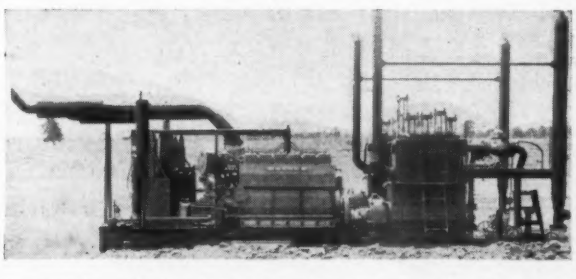
(15) STACKABLE THREE-CHANNEL CARRIER TELEPHONE SYSTEM. Easily convertible, the new wire-line or radio-link type 33 carrier system permits the installation of a single channel by itself and the later addition of one or two more channels as required. Channels can be stacked on existing single-channel systems of many types. Because it is primarily intended as short-haul equipment,. emphasis has been put on minimizing cost. Its installation is economically feasible on lines as short as 10 miles. Loop gain of a type 33 terminal is 30 db. which represents, in terms of normal operation, the spanning of distances up to 250 miles of wire line without repeaters. Systems can be extended by the use of repeaters which give 25-db. gain and are also stackable so that each channel can be individually repeated as required. Nominal transmitting level is plus 14 dbm. Minimum received level for a zero-db. equivalent is minus 16 dbm. Either two or four-wire operation can be used. *Lenkurt Electric Co.*

IT'S NEW CHECK IT

(16) PORTABLE POWER PIPE THREADER operated by any ½-in. standard electric drill. Threads 1, 1¼, 1½, or 2-in. pipe with one set of high-speed steel chasers, weighs 26 lb. and one man can carry. Threader is furnished complete with one set of high-speed steel chasers and drive adapter. *Armstrong Brothers Tool Co.*

IT'S NEW CHECK IT

(17) FS-9 AND FS-13 DIESEL ENGINES are especially adaptable for oil-well drilling rigs, pipe-line pumping, portable packaged-power units, and stationary power installations. The FS-9 engine has a 9-in. bore and 11½-



in. stroke and the FS-13 engine has a 13-in. bore and 16½-in. stroke. Both are built in supercharged and non-supercharged models. The 9-in. engine is available with from four to eight cylinders. The 13-in. engine is made with from five to eight cylinders. Engine speeds range from 400 to 720 r.p.m. *Norberg Manufacturing Co.*

suspended enclosures boost furnace efficiency

• To provide peak industrial furnace efficiency, B-L suspended enclosures include a four-ply seal—designed to keep heat in, air out.

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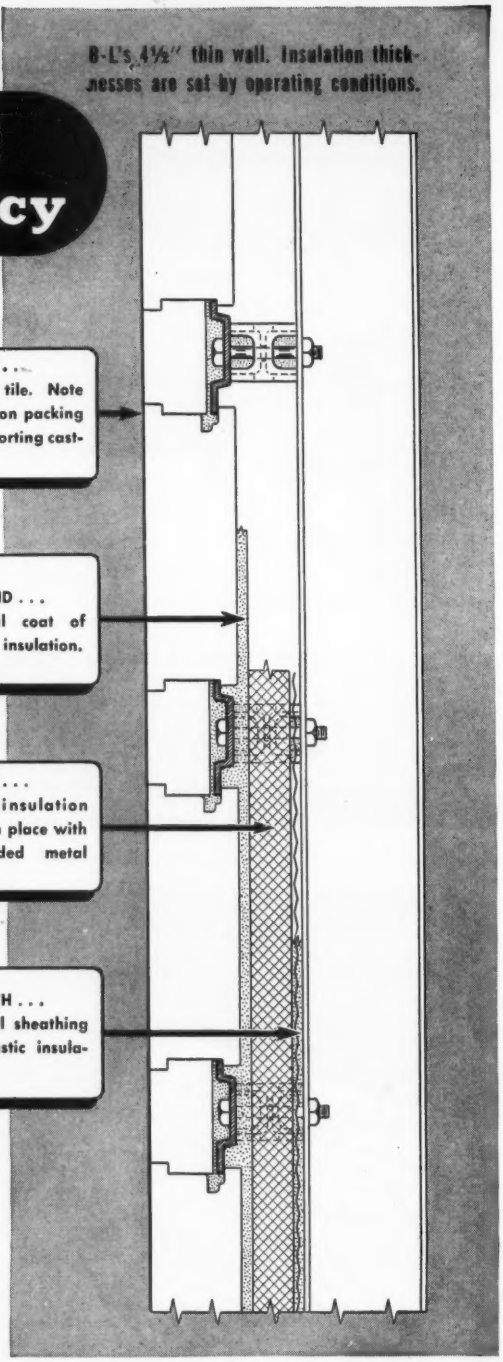
Unit-suspended construction insures unbroken insulation. Blocks tie in to castings and are not affected by tile movements. Castings are completely buried in the insulation to avoid heat drainage. Only point contact spacers extend through to the outside steel.

Bigelow-Liptak unit-suspended walls and arches are used in power plants, for boiler settings; in refineries, for oil heaters and vessel linings; for all kinds of driers and kilns and metallurgical furnaces.


B-L's 4½" thin wall. Insulation thicknesses are set by operating conditions.
FIRST . . . Offset tile. Note insulation packing in supporting casting.
SECOND . . . A seal coat of plastic insulation.
THIRD . . . Block insulation held in place with expanded metal lath.
FOURTH . . . A final sheathing of plastic insulation.

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3. Unit suspension permits flexible design, eliminates cumulative loading.
4. B-L engineers co-ordinate enclosure requirements with problems of temperatures, types of firing equipment, and slagging and erosion possibilities.

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REFINING

New Lube for Hydraulic Machine Tools Introduced

Sun Oil Co. has introduced a new dual-purpose oil for use in hydraulically operated machine tools that pressure-feed way lubricant from the hydraulic system. Called "Lubeway," the new product has been subjected to more than a year's exhaustive testing in machine-tool builders' laboratories and under regular production conditions in industry, the company announced.

It has been found that ordinary hydraulic oils did not perform properly as way lubricants, because they did not possess adequate film strength or metal-wetting qualities. The deficiency caused chattering of the table and excessive wear on the ways, and made close tolerances and fine finishes impossible.

The Texas Co. recently introduced a new lubricant, "Way Lubricant D," designed especially for the lubrication of industrial tableways which the company stated eliminates the chattering and jumping effects that occur at the beginning of the tool stroke.

New Chemical Company Is Formed in Augusta Ga.

A new chemical company has been organized in Augusta, Ga., for the manufacture of detergents, adhesives, resins, dyestuffs, and dispersing agents.

The new company, Phoenix Chemical Co., was organized by Phoenix Oil Co., and will occupy part of the new plant recently completed by Phoenix Oil. Products will be distributed throughout the southeast to textile manufacturers, plywood, leather-tanning plants, and paper industries.

Dow Will Expand Plant Facilities in Canada

A $5,000,000 plant - expansion program at Sarnia, Ont., Canada, will be carried out by Dow Chemical of Canada, Ltd., during 1949, according to an announcement made by N. R. Drawford, Toronto, company president. The program will involve the building of four new plant units, a central research laboratory, and extensive additions to another plant unit.

The project would boost to more than $17,000,000 the value of Dow Chemical units in the Sarnia area. It forms part of a long-range development program aimed at an eventual plant investment of $40,000,000.

Major items of the 1949 project will be a new ethylene - production plant to provide further feed stock for ethylene glycol antifreeze.

Present Dow facilities at Sarnia, representing an investment of some $12,-500,000, include the ethylene - glycol plant and a Styrom plastic-molding power plant which is scheduled to go into production this month.

Technical Papers Will Be Discussed at A.I.Ch.E. Meet

Papers featuring catalytic cracking, in which yields and operating conditions for converting heavy petroleum fractions to gasoline, is described, will be discussed at the regional meeting of the American Institute of Chemical Engineers, to be held in the Biltmore Hotel, Los Angeles, March 6-9.

A "Symposium on Bubble Plate Phenomena" will be given which will cover what happens inside a distillation column. An additional paper will deal with small-scale tests on a method of taking smog-producing sulfur dioxide out of the gases that result from burning sulfur-containing fuel.

W.P.R.A. Reports Lube Oil Production Down Over 1948

The Western Petroleum Refiners Association's statistical report for the month of December 1948 shows that total production of bright stock, solvent bright stock, viscous neutrals, solvent viscous neutrals, paraffin oils, steam refined stock, and blended oils by 13 companies in the Midwest was down considerably compared to December 1947.

Total bright stock production for the last month of 1948 was 234,052 bbl. as compared to 274,292 bbl. the comparable month of 1947. Solvent bright stock, however, gained over December 1947 with 112,978 bbl. compared to 101,138 bbl. Total viscous neutrals was 426,645 bbl. compared to 544,618 bbl. in December 1947; solvent viscous neutrals totaled 253,693 bbl. in December 1948 compared to 248,541 bbl. in December 1947. Paraffin oils production totaled 102,595 bbl. in December 1948 compared to 108,513 bbl. the comparable month in 1947. Steam refined stock totaled

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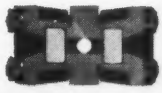

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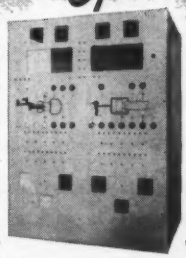

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22,992 bbl. compared to 38,289 bbl. in 1947, and blended oils totaled 514,721 bbl. compared to 573,204 bbl. in 1947.

Esso to Handle Products Formerly Made by Stanco

A new sales group, "Specialty Sales," was recently formed by Esso Standard Oil Co. to handle sale of products formerly manufactured and handled by Stanco, Inc., an affiliate recently merged with Esso Standard.

The new group, formed within Esso Standard's marketing department, will also handle certain products other than automotive specialties, now marketed by the tires-batteries-accessories division.

A. J. Millard, formerly head of the Stanco unit, has been named manager of the new group.

Germans Obtain Artficial Resins From Acetaldehyde

Artificial resins were obtained experimentally from acetaldehyde, according to data microfilmed in Germany. The feat was accomplished at I. G. Farben Research Laboratories in Oppau, according to the Office of Technical Services. Data was analyzed in cooperation with the British Government.

The Department of Commerce reports that the analyses are contained in a report now available to the American public.

Additional Speaker Named For A.P.I. Lube Meeting

An additional speaker, to address the lubrication committee of the American Petroleum Institute in St. Louis, Mo., February 21-23, has been announced. He is A. C. Pilger, Jr., Tide Water Associated Oil Co., eastern division, Detroit, who will talk on "Crankcase Draining for Cleanliness and Safety" during Wednesday's session February 23.

The annual winter meet is scheduled at the Jefferson Hotel.

Aerosol Fogging Scheduled For Adirondack Region

Sovacide F, a petroleum product developed by Socony-Vacuum Oil Co., Inc., for outdoor aerosol fogging, will be used this spring in treating an area of 8,000 to 10,000 acres in an Adirondack resort region in Herkimer County, New York. Cost of the operation is estimated at $25,000.

The chemical was first used last year in treating an area of about 4,000 acres and according to company technicians 90 to 95 per cent of the blackfly population was exterminated at a cost of about $2.25 per acre. The Sovacide F solution containing about 15 per cent DDT was applied at a rate of slightly more than 1½ pt. per acre from special nozzles on the exhaust stacks of a helicopter and on ground equipment.

The area received three applications at intervals of approximately 10 days during June last year, totaling 6/10 gal. of Sovacide F and ¾ lb. of DDT to each acre. Wildlife, domestic animals, humans, and vegetation were not affected.

New Technical Club Formed

Chemists and engineers of Standard Oil Co. (Ind.) have formed "Whiting Science Club," designed to broaden the technical background of its 350 members. The group will meet five times a year to hear eminent authorities in various scientific fields.

Training Course Begins

Socony-Vacuum Oil Co., Inc., recently opened a 5-week training course on various phases of industrial relations procedure and policies for staff assistants and others assigned to this activity in refineries and marketing divisions. Most sessions will be held in the company's headquarters in New York. Several field trips have been arranged for refineries and marketing division offices.

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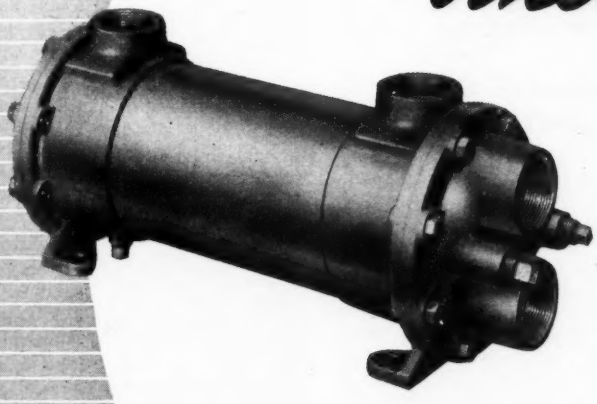

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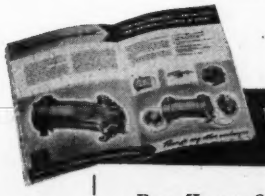

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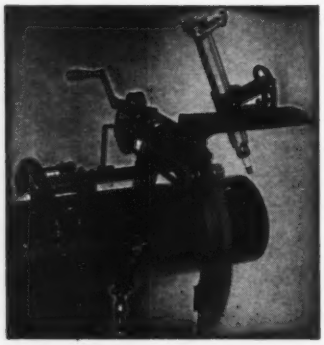

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PIPE LINES

Texas Empire to Use 18-In. for Illinois Line

Texas Empire Pipe Line Co. has completed arrangements for using 18-in. throughout the construction of the 197 - mile Patoka - Wilmington, Ill., crude-oil line. Earlier in the planning of this undertaking, it appeared that it would be necessary to use 20-in. for part of the project.

Specifications for pipe laying have been mailed by the company to contractors with request that bids be submitted February 24. Pipe is expected to commence arriving in March. Construction is scheduled to begin April 1.

Transcontinental Office Established at Houston

Transcontinental Gas Pipe Line Corp. has established headquarters in the Niels Esperson Building, Houston, according to an announcement by Claude A. Williams, president. There will be approximately 900 employes in Houston, according to reports.

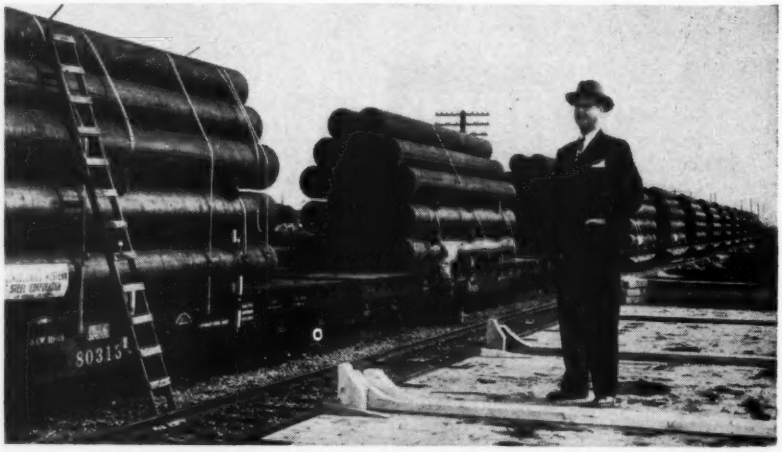
The first shipment of pipe from Consolidated Western Steel Corp. plant at Los Angeles consisted of 100 cars of 30-in. pipe destined for the point of commencement of construction near McComb, Miss. Each flat car was loaded with 17 31-ft. joints. Transcontinental's 1,840-mile Texas-New York City line is scheduled for completion in 1951. During 1949 pipe shipments are to start at the rate of about 35 cars daily which will be increased later in the year.

Gas-Transmission Capacity Upped Latter Part of 1948

Transmission facilities for natural gas, designed to increase the nation's pipe-line systems by more than 600,000 M.c.f. daily, and involving more than 2,000 miles of new pipe line, were authorized during the 6-month period between July 1 and December 31, 1948, Nelson Lee Smith, chairman of the Federal Power Commission, reported.

Total estimated construction cost of the approved facilities was $191,382,265, of which $139,749,872 was for major projects to cost $700,000 or more. Larger projects are expected to benefit 32 cities of 50,000 population or over, in 12 states and the District of Columbia, in addition to numerous smaller communities. It is estimated that construction of these major projects will increase capacities of the systems involved by at least 580,100 M.c.f. daily.

Largest single authorization during the 6-month period was for El Paso Natural Gas Co. to construct approximately 720 miles of pipe line which would add 180,000 M.c.f. of daily delivery capacity to the company's



The first 100-car shipment of 30-in. pipe for Transcontinental Gas Pipe Line Corp.'s 1,840-mile Texas-New York line was shipped over tracks of the Santa Fe Railway recently, from Los Angeles, where it was fabricated by Consolidated Western Steel Corp., to Texas. On hand to see the initial shipment was Claude A. Williams, president of Transcontinental. When completed, the line will be the longest continuous pipe line in the world, and will connect natural-gas fields of Texas and Louisiana with New York

system. Other projects include Tennessee Gas Transmission Co.'s authorization to construct 515 miles of pipe line which would increase daily capacity of its system by 111,000 M.c.f., and the Southern California Gas Co. and Southern Counties Gas Co. of California 103-mile project, to add 100,000 M.c.f. daily to the capacity of the companies' systems.

Projects covered by certificates of public convenience and necessity issued by the commission during the latter half of 1948 involve construction of 2,203 miles of pipe line and installation of compressor units aggregating 150,304 hp., Smith said.

Excellent Progress Made On Ozark Pipe Line

Construction work on the Ozark pipe-line system (managed by Shell Pipe Line Corp. for Shell and Texas Pipe Line Co. interests) is making good progress despite the recent snows and blizzards in the Oklahoma and Missouri territories traversed by this project. A progress report as of February 7 on the laying of this 435-mile 22-in. pipe line, which extends from Cushing, Okla., to Wood River, Ill., is as follows:

The work of clearing the right-of-way is 41 per cent complete. Stringing of the pipe is 27 per cent complete; ditching 18 per cent; welding 16 per cent. Pipe coating, lowering in and back filling is 10 per cent along.

One of the two crossings at the Cimarron River and the single crossing of the Verdigris River are practically complete. Work on one each of the two crossings of the Arkansas River and Missouri River is progressing at a satisfactory rate.

Pump station sites are prepared and the four pump-house foundations are about one-third complete.

Ozark pipe laying is being done by three prime pipe-line contractors, Midwestern Constructors, Inc., Smith Contracting Co., and Anderson Brothers Corp., using six spreads of equipment. Completion of the new line is scheduled for June 1, 1949.

South Jersey Gas Is Ready To Construct New Gas Lines

As soon as the Federal Power Commission approves its petition to receive 6,500 M.c.f. of natural gas daily from Texas Eastern Transmission Corp., South Jersey Gas Co., Atlantic City, N. J., is prepared to spend $2,000,000 on pipe lines to connect to lines owned by Texas Eastern, reports indicate. The FPC staff recently recommended that the company's application be granted.

The 6,500 M.c.f. of gas daily will be used to service consumers in Glassboro, N. J., and later in Atlantic City. Estimated initial cost of construction of the lines, under the Delaware River and south to Glassboro, would be about $1,000,000, and an additional $1,000,000 would be required to extend the pipe line from Glassboro to Atlantic City. Ultimately it is planned to extend natural gas to other consumers in the company's territory.

Southern Jersey Gas Co. is an independent public utility, and represents the merger of two former subsidiaries of Public Service Corp. of New Jersey, Atlantic City Gas Co., and Peoples Gas Co.

U. S. Canadian Committee Studying Gas Line Proposal

Northwest Natural Gas Co.'s proposal to build a pipe line to transmit natural gas from Alberta Province, Canada, to Spokane, and Seattle, Wash., and Portland, Ore., has been referred to the fuel and energy subcommittee of the Canada-United States committee of the two national chambers of commerce for study and future recommendations.

The proposed project would include a 24-in. main line from gas fields of Alberta to supply Trail and Vancouver, B. C., and the three United States cities. The project would involve expenditure of approximately $100,000,000.

Northwest Natural filed an application for a certificate of convenience

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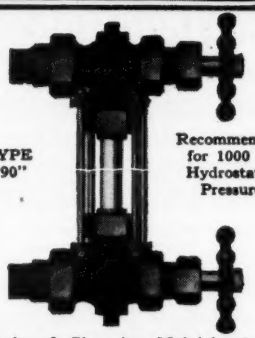

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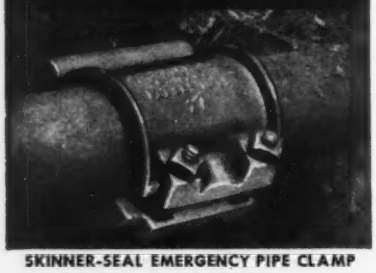

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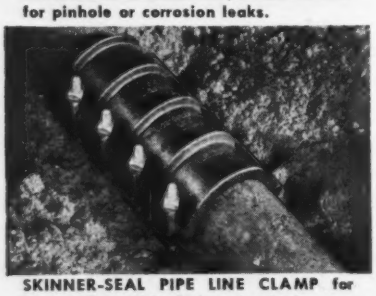

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and necessity with the U. S. Federal Power Commission the latter part of 1948.

Southern, Atlantic Gulf Hearing to Be Held May 16

The Federal Power Commission has scheduled for May 16 in Washington a hearing involving applications by Southern Natural Gas Co., Birmingham, Ala., and Atlantic Gulf Gas Co., Shreveport, La., for authorization to construct and operate additional natural-gas transmission facilities. Southern Natural filed application March 31, 1947, and Atlantic Gulf on April 14, 1947.

Southern Natural is seeking authorization to construct a 375-mile pipe line extending from Gwinville field in Mississippi, to Atlanta, Ga., with extensions to LaGrange and West Point, Ga., and Lanett, Shawmut, Langdale, Fairfax, and Riverview, Ala.; a 225-mile trunk line extending from Gwinville - Atlanta line to Colfax, Ga., with extensions to the areas of Tallahassee and Jacksonville, Fla.; Savannah, Ga.; and Georgetown, S. C. Estimated cost of the project is $43,625,895.

Atlantic Gulf proposes to construct a 1,530-mile line extending from Mississippi to Georgetown, S. C., and Jacksonville, Fla., area. The company estimates cost of the facilities at $57,126,000.

Early last week FPC conducted a hearing in connection with the application for permit from Trunkline Gas Supply Co., for a line in Louisiana and Texas fields, for deliveries to Northern Natural Gas Co., and Michigan Wisconsin Gas Co.

Eastern Tennessee May Get 25,500 Tons of Pipe

Possibility that East Tennessee Natural Gas Co. may obtain 25,500 tons of 22-in. steel line pipe for construction of a natural-gas line appeared likely, as Secretary of Commerce Charles Sawyer, and Attorney General Tom Clark approved a voluntary plan in Washington making the pipe available.

The pipe will be used in a line from a point near Mitchellville, Tenn., to the plant of the U. S. Atomic Energy Commission at Oak Ridge, a distance of approximately 164 miles.

Arkansas Would Tax Lines

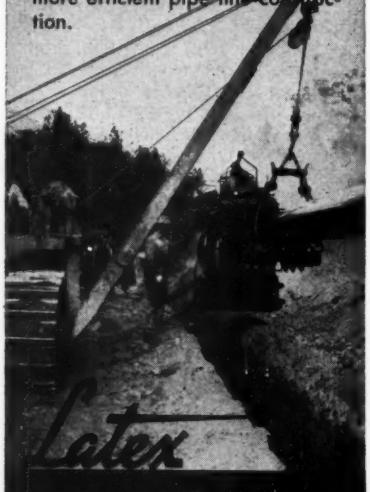
A bill has been introduced in the Arkansas Senate calling for a tax of $1 per lineal foot on certain pipe lines.

Introduced as Senate Bill 148 by Senator Jones, it would apply to any new pipe lines to be constructed in the state. It would exclude lines under 19-in. and under 50 miles in length. Income from the proposed tax would be split as follows: 35 per cent to old-age pensions, 25 per cent to schools, 5 per cent to veterans, and 35 per cent to the building fund of the University of Arkansas.

New Line Input High

During the first 42 days of operation of the new 26-in. pipe line from Kansas-Hugoton field to connection with Cities Service Gas Co.'s existing system, daily input at the field averaged a little over 139,000 M.c.f. The line was put into service December 13, 1948. Gas available for use in the company's network averaged slightly more than 87,000 M.c.f. daily from the new line.

Years of experience and specialization, combined with a well integrated organization, results in more efficient pipe line construction.



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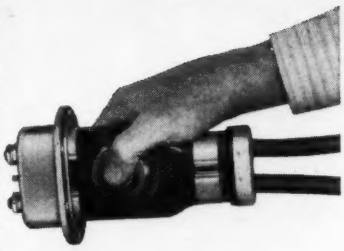

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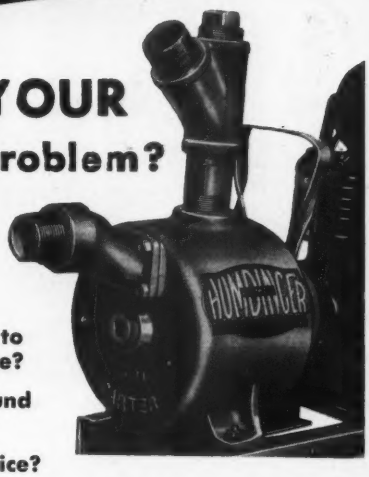

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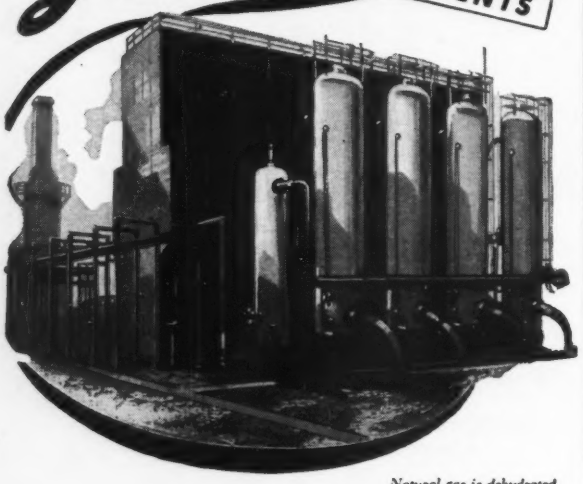

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NATURAL GAS

Natural-Gas Sales Rise to Continue, NSRB Says

WASHINGTON.—Natural-gas sales by public utilities in 1952 will be 55 per cent above those of 1947 and 81 per cent more than in 1945, the last year of wartime conditions, it was predicted by the National Security Resources Board in a report on gas-industry supply and requirements released over the week-end.

Increases also are expected in the use of natural gas in the field, for production of carbon black and by industrial plants located near sources of supply, but no forecast of the extent of these increases was made in the report, embodying the results of a survey by a technical task group of gas-industry representatives under the direction of Edward Falck, chief consultant to the NSRB on power and utilities.

A major difficulty in estimating future demand is the uncertainty regarding the completion time of projects under way or proposed by the gas industry which, for the 1948-52 period, will involve capital expenditures in excess of $3,000,000,000, over 80 per cent of it for natural-gas facilities.

"Current relationship between market prices for gas fuels and those for coal and oil are significant and constitute a second major difficulty in estimating future demands," Falck said. "Advancing prices for the latter fuels, while prices for gas have remained comparatively stable, have resulted in unprecedented demands for gas, especially natural gas, wherever and to the extent that it could be supplied. So long as these price relationships continue, with gas in many instances the cheapest as well as the fuel most preferred for its inherent qualities, there will be virtually no limit to the total consumer demands for it. Demand trends for gas, therefore, will depend largely upon the future structures of gas, oil and coal prices in relation to each other."

For these reasons, Falck pointed out, the estimates of utility gas sales cannot be taken as a measurement of "requirements" in the usual meaning of that term as signifying the total economic demands of consumers. Unless there are changes in the pipe and price conditions, the sales forecast in the report must instead be regarded as a measure of the expected availability of gas in the several market areas.

Congressmen Seeking Oil, Gas Experiment Station

WASHINGTON. — Legislation providing for the establishment by the Bureau of Mines of a petroleum and natural-gas experiment station in northwestern Pennsylvania was introduced in Congress last week by Senators Edward Martin and Francis J. Myers and Rep. Leon H. Gavin.

The bills provide for an appropriation of $1,000,000 for the erection and equipment of the station and $500,000 annually for maintenance and operation.

The station would conduct researches and investigations on the production, refining, transportation, and use of petroleum and natural gas and would be designed as a center for information and assistance in matters pertaining to the conservation of resources for national defense as well as more efficient operation of the several branches of the industry.

Gas Reserves Ample for 35 Years, Oberfell Predicts

Proven natural-gas reserves in the United States are adequate to meet demand, on the present rate of consumption, for 35 years, G. G. Oberfell, vice president of research and development, Phillips Petroleum Co., told the Chemical Engineers Club of Washington, D. C., February 7.

Oberfell pointed out that the natural-gas industry of the United States currently is the source of approximately one-seventh of our total energy consumption. He predicted that future prospects for the industry are believed to lie chiefly in further extensions of present fuel outlets.

Firm Seeks to Modify N. Y. Ban on Home-Heating Gas

Home Gas Co. Vice President Irving K. Peck urged the Public Service Commission of New York at a hearing February 10 in Albany to modify its order prohibiting utilities from increasing the number of their customers using natural gas for home heating.

Peck, also general manager of the company which supplies Rockland Light & Power Co., in Orange and Rockland counties, and Rockland Gas Co., in Rockland County, said Home Gas Co.'s estimated supply for the winter of 1949-50 would be sufficient to fulfill all of the pent-up demand if the commission relaxed its order. He said that it had been assured of a daily supply of 10,000,000 cu. ft. of natural gas, but while this would be sufficient to fill half of the new demand for heating, this demand could not be met without construction of new pipe lines.

Natural-Gas Sales Gain Continues in December

An American Gas Association report shows that natural-gas sales by utilities to ultimate consumers in December 1948, were 9 per cent over the comparable month in 1947, totaling 2,844,921,000 therms. Mixed-gas sales showed a decline of 19.4 per cent, to total 116,748,000 therms.

During the same month manufactured gas sales registered a decline of 8.1 per cent for a total of 214,457,000 therms. Total sale of all gas by utilities to consumers was 3,176,126,000 therms, a gain of 6.3 per cent over December 1947.

For the 12 months ended December 31, 1948, total sales of gas amounted to 32,532,544,000 therms, an increase of 9.1 per cent over the same period a year earlier. Natural-gas sales during the year ended December 31, 1948, showed a gain of 11.1 per cent over the same period a year earlier, with a total of 28,944,077,000 therms compared to 26,058,000,000 therms for the year ended December 31, 1947.

Natural Gasoline

Leduc Field to Get New Natural-Gasoline Plant

Construction of a new $6,500,000 natural-gasoline plant in the Leduc oil field by Imperial Oil, Ltd., will begin in the spring of this year, Walker Taylor, western manager of the company, announced.

With a capacity of 24,000 M.c.f. daily, the proposed plant will produce propane, butane and natural gasoline. Following completion of the plant in 1950, Taylor added that there need be no appreciable volume of gas flared in the field.

The plant will consist of a gas-gathering system, compressor station and a gasoline plant. It will be equipped to repressure residue gas back into the oil field, Taylor said.

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Among the

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Active Rotary Rig Totals Show Further Decrease

A further decrease in the number of active rotary rigs in the United States and Canada, maintaining the totals at a much lower level than at the end of 1948, is shown by figures recently released by the Interstate Oil Compact Commission. Most of the decrease originated in West Texas where almost 100 fewer rigs were running on January 31 than a week previously.

Totals by areas as of January 31 are as follows:

	Jan. 24	Jan.31
Pacific Coast	180	191
Oklahoma, Kansas	352	314
Rocky Mtn. (including W. Canada)	179	168
Ark., La., Tex.	176	166
West Texas, New Mexico	547	449
Gulf Coast	575	592
Illinois	87	61
	2,096	1,941

Bay City Drilling Co. has been awarded contract to drill H. A. Potter et al 3 Henry T. Freeman, in Thomas McCoy and D. Deckro surveys, approximately ½ mile north of Sargent townsite, in Matagorda County, Texas.

W. T. (Tex) Westergard has recently joined **Housh Drilling Co.**, Houston, in an executive capacity. Westergard comes to the drilling company from E. H. Edwards Co., manufacturers of wire rope, with whom he served for 14 years — 6 as San Francisco sales manager and 8 as branch manager in Houston. He also worked for a time with Hancock Oil Co. of California in Long Beach. An engineering graduate of University of California, he was born in El Paso, Tex.

J. C. Hawkins Drilling Co. has been awarded contract to drill Houston Oil Co. of Texas 3 Fee, 29-6s-12w, in Fields pool of Beauregard Parish, South Louisiana, to the Yegua sand.

J. C. Means will drill 1 Fee, in the West Bivens pool, Beauregard Parish, South Louisiana, for Houston Oil Co. of Texas. Test will be drilled to the Wilcox.

Crew of W. P. Taylor Drilling Co., Houston, on location at the Blanco Oil Co. 1 Scarpa wildcat 5 miles south of Ganado, Jackson County, Texas. The men are R. O. Bell, driller; T. H. Braddock, derrick; W. A. Stewart, fireman; J. F. Bilek, W. K. Talbert, helpers

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Fitzpatrick Drilling Co. Corpus Christi, Tex.

Growth.—Fitzpatrick Drilling Co. was organized in April 1939 with two rigs. Since that time two new rigs have been added and the original rigs have been modernized and equipped for greater drilling depths. Main office of Fitzpatrick is at 306 Wilson Building, Corpus Christi.

H. G. FITZPATRICK

Equipment.—Three heavy steam rigs and one 11,000-ft. power rig.

Personnel.—H. C. Fitzpatrick, president; M. E. Tonroy, vice president; W. S. Fitzpatrick, treasurer; Salisburg B. Filbert, secretary and office manager. Tool pushers are: Dorsey Roberts (6 years with company); C. J. Newton (1½ years); Joe Roth (9 years); and H. H. Whitfield (5½ years).

Sidelights. — Currently, Fitzpatrick has its three heavy steam rigs operating in South Texas for Humble Oil & Refining Co. and Sinclair Prairie Oil Co. Its heavy power rig has been drilling for the past year in Andrews County in West Texas. . . . Firm has recently finished drilling a directional well for Sun Oil Co. in San Patricio County to kill a blowout. . . . In the past 9 years the firm has drilled 25 wells in Nueces Bay and 47 wells on the famous King Ranch near Kingsville, Tex. . . . A total of 163 wells have been drilled, mostly for major oil companies, in Southwest Texas. . . . Fitzpatrick has entered the production field on its own only to a limited extent at this time.

Management Training Scheduled by A.A.O.D.C.

Seminars for executive and administrative personnel in the drilling industry are now scheduled for seven oil centers in the Mid-Continent and Rocky Mountain areas. Some of the seminars have already been held in some of the centers with others scheduled until July. Conferences conducted by University of Texas and Oklahoma A. & M. College, will be held in Tulsa, Oklahoma City, Evansville, Ill., Salem, Ill., Denver, Casper, Wyo., and Wichita.

The subjects to be presented are: Functions of Management, Personnel Problems in the Drilling Industry, Application of Cost Factors in Drilling, Management Responsibility in Accident Prevention, Security for the Drilling Organization, and the Legal Position of the Drilling Contractor.

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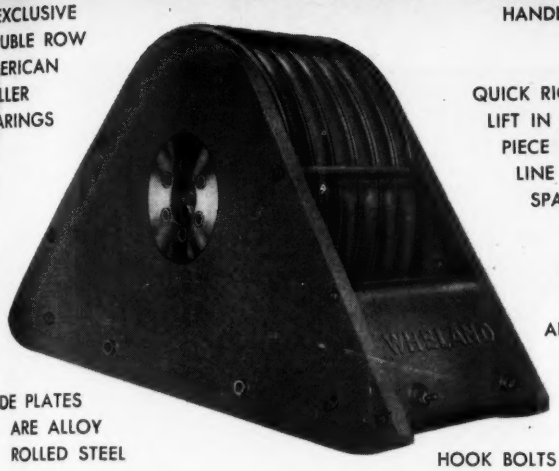

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XUM

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Exploration and Drilling

Geophysical Case Histories—Volume 1

ONCE in a while a book is published that marks an unusually important point in the history of the subject that the book covers. On such occasions the actual content of the book is apt to be of less significance than the historical milestone of the fact itself. When a term like "historical milestone" is used, it implies a reference to a road that started somewhere in the past, and promises to continue to somewhere in the future.

Volume I, Geophysical Case Histories, is that kind of a book. It is a proud achievement for its publishers, the Society of Exploration Geophysicists. But it is worth studying, in the opinion of informed people, from a different angle by the entire exploration branch of the petroleum industry. They believe it is particularly important to individuals who are now executives, or who hope some day to become executives.

Our industry spent $105,000,000 on geophysical work in 1947 within the continental boundaries of the United States alone. *(See The Oil and Gas Journal, September 30, 1948, page 70.)* In 1948 the sum was undoubtedly larger. How much larger will probably be made known by Dr. E. A. Eckhardt, of Gulf Research & Development Co., at the St. Louis joint exploration societies' convention next month.

Is this large sum of money justified? Is it being utilized efficiently? Should it be expanded to get the maximum efficiency from the application of geophysics to exploration problems? These are important questions, but no one man will answer them. The industry's answer will be the net balance of the decisions of hundreds of individuals.

Where geophysics will travel "from here" is important. But in reaching individual decisions, many men will decide to look back and see how they happened to travel "to here" in the first place. That is where Geophysical Case Histories serves an important purpose. Every surveyor knows that at an important turning point, a good backsight is essential, if he is to get a good foresight.

For instance, in the editor's foreword, he says: "Very few of the cases show the orderly development of information from geophysical reconnaissance through detailing to discovery and development of an oil field. Some of the geophysical stories are told by a single seismograph survey which was followed by aggressive development. In other cases the story is complicated by a series of geophysical surveys of different kinds, by different companies, at different times. These variations serve to exhibit the many different courses which the development of a prospect may take, and to show that finding an oil field is not always a straightforward scientific process. A discovery may be directed or strongly influenced by geophysical results, but there may be other factors of chance, competition, and timing, and finally of judgment, hunch, or guess on the part of the oil executive who is called on to make the gamble involved when a wildcat well is drilled."

These words give a very apt description of the oil business as it really operates. You could substitute geology and geological terms in the editor's words, and they would be equally true. With only slight changes in words here and there, they describe the acceptance and use of scores of instruments or tools now used in our industry; and you wouldn't need to confine yourself to the exploration branch. In effect the editor says that human nature and luck have often affected the use of geophysics.

Oil men, like other business men, are likely to be influenced by their personal experiences. Geophysical Case Histories offers an opportunity to compare your own personal experience in geophysics with 49 actual case histories of fields all over the United States, 1 in Venezuela, 1 in the Middle East, and 2 in Europe. Before making a foresight to determine your judgment of the best future use of geophysics, you might want to take some backsights on the past experiences of other people.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN AREA.—Saturated Tensleep cores were recovered by Atlantic Refining Co. at the Riverton, Wyoming, wildcat. Operator is preparing to test at 11,714 ft., total depth. A new pay seems probable after drill-stem tests at the Phillips Petroleum Co.-Pioneer Oil Corp. Golden Eagle, Wyoming, deep test.

WEST TEXAS.—The Bend group of limes and shales (lower Pennsylvanian) was added as the fourth pay in the Benedum field at Plymouth's 1-46 Elliott, on the Reagan County side, 1 mile northeast of the nearest Ellenburger production. The well completed for 257 bbl. of 52°-gravity oil a day, with no water, through ½-in. tubing choke. Stanolind and Danciger 1 Miller, southeast Reagan County wildcat, flowed 244 bbl. of oil in 14 hours from the Silurian.

EAST TEXAS.—In Navarro County, Nelson & Edwards Morris 1 Bain was showing for a small Woodbine discovery, flowing oil after a week's shutin. In the Long Lake field of Anderson County, Tide Water et al cleaned out, retested, and completed their 1 Monnig as a new pay discovery in the Rodessa.

CALIFORNIA.—Superior Oil Co. set a new world depth record at its 1 Limoneira, Ventura County test, and continues drilling below 17,824 ft.

NORTH TEXAS.—Cities Service 7 Sealy has narrowed the gap between the Chico field and the West Chico area, with a completion potential of 252 bbl. of oil a day. A second attempt to extend the western limits was announced by Big Bear Oil Co.

XUM

KANSAS

Barton County Wildcat Gets Arbuckle Show

ALADDIN PETROLEUM CORP. and Hannum Drilling Co. have a prospective pool opener in Barton County about 1 mile north of Hammer pool. The well, 1 Brodie, SW SW SE 23-19s-12w, swabbed 7 bbl. per hour from a total depth of 3,364 ft. in the Arbuckle which was topped at 3,344 ft. The well bailed 1 bbl. per hour at a depth of 3,352 ft., was deepened to 3,355 ft. and treated with acid and bailed 2 bbl. per hour. The 7-bbl. rate came after further drilling to 3,364 ft. The well also had shows in the Lansing-Kansas City on tests at 3,093-3,266 ft. Northeast and Southwest diagonal offsets have been staked.

J. M. Huber Corp., Pabco Drilling Co., and Kingwick Oil Co. are testing 1 Berk, SW SE NE 30-27s-4w, on the western edge of Sedgwick County. The Mississippian was topped at 3,708 ft. and well was drilled to a total depth of 3,750 ft. When plug was drilled, the well started flowing to pits and was shut in for tanks. The new well is less than 1 mile north of Bartholomew pool, opened by a gas well that later started making oil.

Anderson-Prichard Oil Corp. has opened a new pay zone in West Orth pool with the completion of 4 Feist, NE SW SW 21-18s-10w, Rice County. Production is from the Topeka lime at 3,030 ft. Potential is 28 bbl. per day on pump. Other production in the field is from the Arbuckle.

Another test for the area west of Hugoton field is C. U. Bay 1-C David Buhrle, SE SE NW 4-26s-41w, Hamilton County. Operator is drilling below surface pipe, set at 704 ft.

The southern edge of Barton County continues active as E. H. Adair starts 2 Santerman, SE SE SE 34-20s-12w. The well is about ½ mile southeast of 1 Santerman, now testing the Arbuckle and reported to be pumping 25 bbl. per hour. Adair is also testing at 1 Wolf, NE NE NW 3-21s-12w, across the line in Stafford County, with the well reported as swabbing 8 bbl. per hour.

For the week, a total of 49 new locations were reported. Barton and Butler counties had seven each, Russell reported six, and Rice and Rooks accounted for five each.

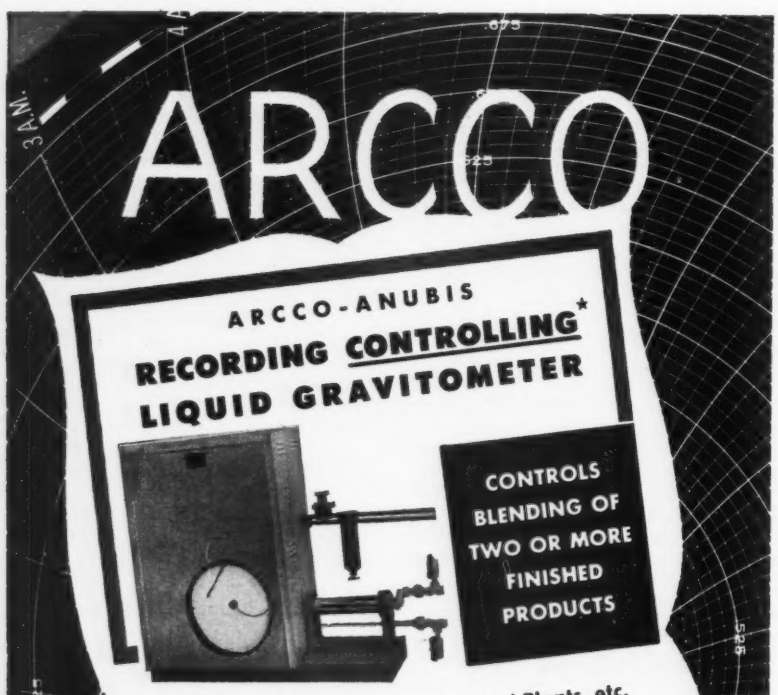
KANSAS SUCCESSFUL WILDCATS

Rooks County: Heathman & Honaker 1 Hayden, NE NE SE 31-8s-18w, pumped 122 bbl. of 32.6°-gravity oil per day from Arbuckle at 3,513-17 ft.; anhydrite 1,535 ft., Heebner 3,227 ft., Lansing 3,267 ft., TD 3,517 ft.

Stafford County: Crown Oil Co. 1 Williams, SW SW SW 32-23s-13w, flowed 779 bbl. of 34°-gravity oil per day from Lansing at 3,669-77 ft.; anhydrite 785 ft., TD 3,679 ft.

KANSAS WILDCAT FAILURE

Marion County: Stormfeltz 1 Graham, NW SW NW 35-19s-5e, dry, TD 2,390 ft., Viola 2,372 ft.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OKLAHOMA

Elk City Extension Completed as Oil Well

SHELL OIL CO. has completed 1 Long, C NE SW 15-10n-21w, Beckham County, 1 mile west of the discovery well of Elk City field. The Long well flowed 2,345 bbl. of 49.1°-gravity oil, 72 bbl. of fresh water, and 3,654,000 cu. ft. of gas from perforations at 9,040-80 ft. Calculated from an elevation of 1,983 ft., the datum on the pay zone is —7,057-97 ft. Drill-stem tests, made while the well was drilling, found wet gas and distillate in the upper part and oil in the lower sections of what was classified as a limy zone at —6,913-7,117 ft. The completion zone is about 300 ft. higher than the granite wash pay in the discovery well, Shell 1 Walters, 1 mile to the east.

The northwest-southeast drilling trend in Elk City field has created new interest in an old abandoned wildcat in Washita County and southeast of the field. Max Pray et al 1 Proctor, C NW 28-10n-20w, has been cleaned out and casing perforated for tests at 9,655-9,705 ft. With packer set at 9,623 ft., the well had air at once and gas in 5 minutes but no estimates of production were given.

In Okfuskee County, Portable Drilling Corp. drilled plug at 1 Harge, NW SE NE 31-13n-10e, and the well made 132 bbl. of oil in the first 3 hours with gas at the rate of 3,000,000 cu. ft. per day. Production is from open hole at 2,885-98 ft. in the Gilcrease sand. Testing will continue to determine the best production rate.

Pecan Grove pool, opened early in the year by Gulf Oil Corp. and F. B. Murta 1 Davis, SW SW NW 20-8n-9e, Hughes County, has two confirmation wells preparing to test. The south offset, J. A. Chapman 1 Harjo, is swabbing in with casing set at 3,312 ft. The west offset, Mid-Continent Petroleum Corp. 1 Fixico, is preparing to drill plug. Gulf has a location staked at 1 Wade, a southwest diagonal offset.

Anderson-Prichard Oil Corp. is adding another good well in the North Lindsay area of McClain County at 1 Gray, C SE NE 27-5n-4w. Well flowed at the rate of 86 bbl. per hour from the Hunton through ½-in. choke. In a 4-hour test through casing, the well made 132 bbl. per hour.

Amerada Petroleum Corp. has added another good well in Southwest Alabama pool, Hughes County, with the completion of 2 Fulks, NE NW NW 8-9n-11e. The well

made 354 bbl. in 24 hours. Total depth is 3,005 ft. The pool was opened last September.

OKLAHOMA SUCCESSFUL WILDCAT

Caddo County: Extension to North Cement—Magnolia 3 North Cement Unit, C NW SW 11-6n-9w, flowed 38 bbl. of 40°-gravity oil per day from Marchand sand at 10,780-10,870 ft., TD 10,908 ft.

OKLAHOMA WILDCAT FAILURES

Garvin County: Pray 1 Kennedy, NW SE NW 5-2n-2w, dry, TD 6,946 ft., Gibson lime 6,720 ft., Gibson sand 6,742 ft., Woodford 6,932 ft.

Okfuskee County: Falcon 1 Vanderslice, SW SE SW 1-13n-8e, dry, TD 4,015 ft., Woodford 3,802 ft., Hunton 3,830 ft., Sylvan 3,847 ft., Viola 3,925 ft., Wilcox 3,977 ft., second Wilcox 3,983 ft.

Stephens County: Amerada Petroleum Co. 1 McQueen, SE SW NE 31-2n-5w, dry, TD 10,940 ft., no shows.

SOUTH LOUISIANA

Livingston Parish Test Looks Promising

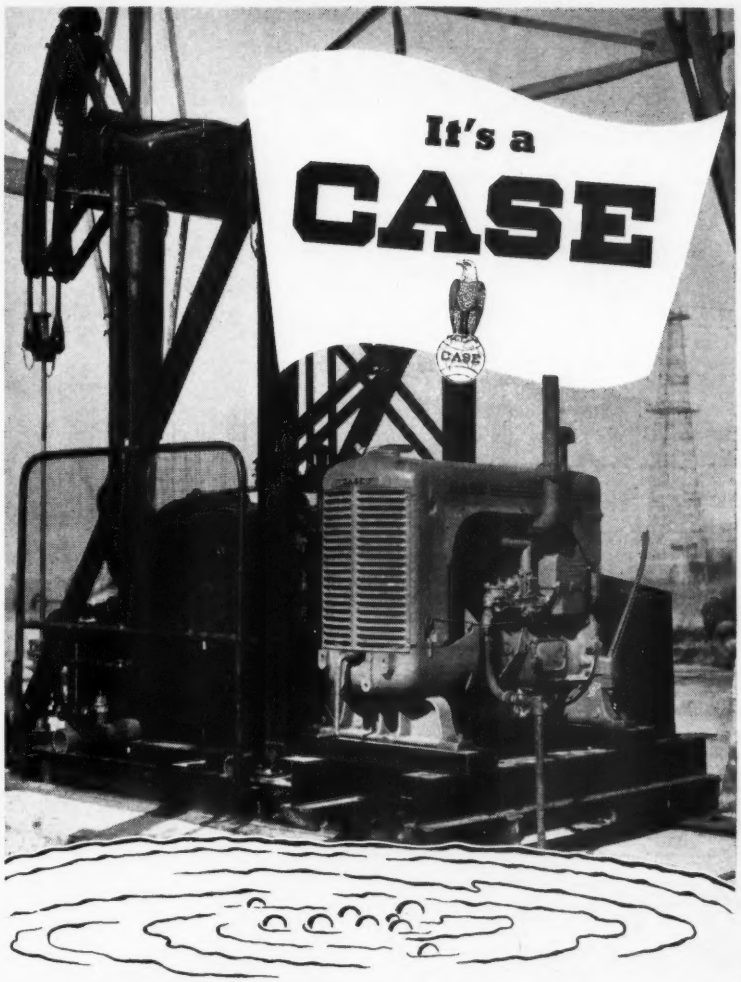
NEW ORLEANS.—Danciger Oil & Refining Co. 1 Myrtle E. Smiley, 9-7s-5e, just north of the city of Springville in Livingston Parish, flowed oil through perforations at 8,273-80 ft., but went to salt water and the section was squeezed off after flowing several days. Hole was plugged back to test a shallower pay which was cored and made a good saturated recovery from 8,003-8,006½ ft. The section was perforated from 8,006½-8,007½ ft. and tested. On a 7/64-in. choke, the well now is flowing at the rate of 7 bbl. of fluid per hour, of which 70 per cent is oil and 30 per cent wash water cut with salt water. Flowing pressure on tubing is 875 psi. This well is more than 15 miles from any oil or gas production in Louisiana. Total depth is 8,748 ft. with 7-in. casing cemented to 8,563 ft.

Hurricane Creek field in Beauregard Parish has been extended to the east 1 mile by Magnolia Petroleum Co. H-1 Doornbos-McPherson. Total depth is 9,100 ft., with 5½-in. casing cemented in the hole to 8,604 ft. to test the regular sands that produce in the field proper. Perforations were made in two sections from 8,293-97 ft., and from 8,280-87 ft., for the test. Through a ⅛-in. choke, the well is flowing at the rate of 30 bbl. of oil per day, plus 5 per cent wash water. Gas-oil ratio 390, and flowing pressure on the tubing is 220 psi. Operators continue to test in an effort to cut the water content from the flow.

The Texas Co. 3-1 State-Bay St. Elaine, Unit Lease 199, Bay St. Elaine field, Terrebonne Parish, has been completed as an oil well flowing 212 bbl. of oil per day through a 7/64-in. choke, gas-oil ratio 788, tubing pressure 1,600 psi., gravity 35.6°. This well was originally completed as a dry hole at a depth of 7,457 ft. Operators drilled to a new total depth of 8,800 ft., and completed through perforations at 8,276-8,308 ft. Top of sand at 8,276 ft.

Superior Oil Co. is making block squeezes in the 4 LL&E Unit 12, a deep test in the Four Isle Dome area, Terrebonne Parish, and will test the well below 14,000 ft. Total depth is 14,564 ft., and hole cleaned out after same heaved to a depth of 14,500 ft. With 7⅝-in. casing cemented to 13,505 ft., a 5-in. liner was cemented from this point to 14,500 ft. The liner has been perforated from 14,095-14,100 ft., and from 14,073-14,078 ft., for the block squeeze, and the production test will be through perforations from 14,079-089 ft. Should this pay be commercially productive, it would be the third producing area in Louisiana below 14,000 ft.

The 12 new locations reported for South Louisiana included 2 wildcat starts, 1 each in Livingston and Terrebonne parishes. Two wildcat failures were completed, one each in Acadia and Vermilion parishes.



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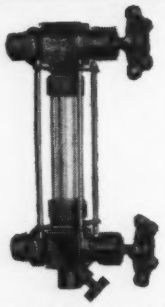

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SOUTH LOUISIANA WILDCAT FAILURES

Acadia Parish: Sun-Sohio 2 Lapleau Estate, Midland area, 49-10s-2w, dry, TD 10,863 ft.

Vermilion Parish: Humble O. & R. Co. 1 Emma Hebert Mixon et al, East White Lake area, 3-15s-1e, 2 mi. N of East White Lake field production, dry, TD 11,746 ft.

SOUTHWEST TEXAS

Starr County Gets New Shallow Oil Pool

CORPUS CHRISTI.—A new oil producing field, Gregg Wood, has been opened by D. G. Wood, Sr., 1 fee, in Porcion 84, 4 miles northeast of Rio Grande City, in Starr County. On potential test the well pumped 25 bbl. of oil per day from oil sand logged at 1,307-20 ft. The second well, Wood's 2 fee, located 660 ft. southeast of the discovery well, has been spudded.

Fred M. Manning 1 J. V. Nelson et al, was completed through perforations at 2,788-98 ft., showing 670 psi. working pressure on drill-stem test, and shut-in pressure of 1,150 psi., to open a new pay zone at the North Mathis gas field of San Patricio County. Total depth is 4,860 ft., with 5½-in. casing set to 3,600 ft. This well also tested good for gas production from 2,629-35 ft. in open hole prior to setting pipe. It is located in W. R. Ray Survey 4, A-337.

A new oil pay sand zone at Mercedes field, Hidalgo County, was opened by V. E. Cook, Tr., 1 J. R. Wade et al, in Tract 2383, Block 57, North Capisallo subdivision. On test the well gaged at 15.18 bbl. per day through a ⅛-in. choke, with gas-oil ratio 110, tubing pressure 0-50 psi., and casing 520 psi. Gravity of oil was 43.7°. Production is through perforations at 7,266-75 ft. Total depth of original hole was 8,806 ft., but operators plugged back to 7,140 ft., and sidetracked and cored sand to depth of 7,283 ft. in the new hole.

New gas production has been opened in wildcat test near the southwest end of the Kelsey field. Nelson B. Hunt Trust Est. 1 Gonzales was completed for gas production through perforations at 4,684-88 ft. Drill-stem test in these perforations flowed gas through ⅛-in. top choke, with 500 psi. working pressure, and bottom-hole pressures of 1,975 psi. open and 2,200 psi. closed in. Total depth is 6,810 ft., with 5½-in. casing set to 5,440 ft. for the completion. Well is located in Tract 8-A, Share 2, Santa Teresa Grant.

There were 37 new locations reported for Districts 1 and 4, of which 12 were wildcat starts, 4 in Starr, 3 in Duval, 2 in Hidalgo and 1 each in Atascosa, Jim Hogg and Medina counties. Five successful exploratory tests were completed, 1 each in Brooks, Hidalgo, San Patricio and 2 in Nueces County. Six wildcat failures were reported, 1 each in Bexar, Duval, Jim Hogg, Jim Wells, Kenedy and Travis counties.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) SUCCESSFUL WILDCATS

Brooks County: New pay and extension, Mariposa field—Arkansas Fuel Oil 1 J. F. Dawson, in J. F. Dawson Sur. 154, A-178, 1¼ mi. E-SE of previous production, top pay 7,780 ft., TD 9,923 ft., perf. 7,781-89 ft., IP: 19 bbl. oil per day through a 5/32-in. choke, GOR 8,957, TP 400 psi., CP 1,000 psi., gravity 41.7°, no water.

Hidalgo County: New oil pay, Mercedes field—V. E. Cook, Tr. 1 J. R. Wade et al, in Block 57, North Capisallo subdn., top pay 7,266 ft., TD 8,806 ft., perf. 7,266-75 ft., IP: 15 bbl. oil per day through ⅛-in. choke, GOR 110, TP 50 psi., CP 520 psi., gravity 43.7°, no water.

Nueces County: New oil pool—Producers Development Co. A-1 Louie Bailey, in Lot 19, Agua Dulce Farm lots, Sec. 36, TD 6,265 ft., perf. 5,967-68 ft., IP: 47 bbl. oil per day through 5/32-in. choke, GOR 26,300, TP 2,100 psi., CP 2,165 psi., gravity 45.4°.

New gas-condensate pay, West Corpus Christi pool—Tide Water Associated Oil Co. 2 Guaranty Title & Trust Co., in J. C. Russell Farm lots, Enrique Villareal Sur., top pay 9,843 ft., TD 11,350 ft., perf. 9,843-73 ft., IP: 1,495,000 cu. ft. gas per day through ⅛-in. choke, with 49 bbl. condensate per day, GOR 30,450, SIP 3,800 psi., WP 2,040 psi., gravity 54°.

San Patricio County: New gas pay, Morgan (Craff) field—Southern Minerals Corp. 2 T. C. Hill et al, in Geo. Morris Sur., A-19, top pay 6,677 ft., TD 7,185 ft., perf. 6,684-88 ft., IP: 10,000,000 cu. ft. gas per day on open flow, SIP 2,225 psi.

SOUTHWEST TEXAS (DISTRICTS 1 & 4) WILDCAT FAILURES

Bexar County: Union Producing Co. 1 L. S. McKean et al, in Fernando Rodriguez

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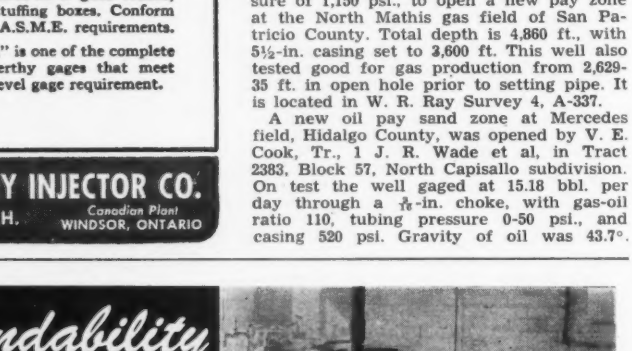

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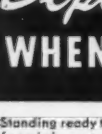

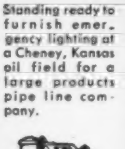

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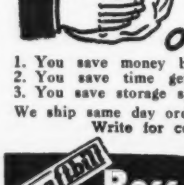

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Duval County: Blanco Oil Co, and Al Buchanan 2 Francisco Lopez, in F. Lopez Sur. 66, 3½ mi. S of Lopez field, dry, TD 3,212 ft.

Jim Hogg County: DeLange, Daubert & Achning 1 C. W. Hellen, in Nariacitas Gr., 3 mi. SW of Hebbronville, dry, TD 3,515 ft.

Jim Wells County: Union Oil Products Co. of Texas 1 R. R. Kibbe, R. P. Haldeman subd. of Seeligson ranch, 6 mi. NW of Premont, dry, TD 6,190 ft.

Kenedy County: Coast Co., H. R. Smith, and W. C. McBride, Inc., 1 D. J. Sullivan, in San Antonio de Encinal (Jose Antonio Leal de Leon) Grant, 17 mi. SW of Saritas, dry, TD 9,015 ft.

Travis County: J. R. Hatch et al 1 T. C. Steiner, in Jose Antonio Navarro Sur., 2 mi. S of Garfield, and 3 mi. NE of Elroy, dry, TD 1,100 ft.

N. CENTRAL TEXAS

Big Bear Oil Stakes West Chico Extension

WICHITA FALLS.—A second attempt to extend the West Chico field of Wise County was announced by Big Bear Oil Co. The new well is to be the 2 J. T. Hunt, 467 ft. from south and east lines of the C. F. McClain Survey, and ¾ mile due south of the same company's 1 Hunt, which was dry at 5,935 ft. The 1 Hunt had a 600-ft. section of conglomerate which yielded some oil shows but not of commercial value.

Other Wise County exploratory work included R. B. Thrift 1 W. O. Blocker, in the W. A. Gorman Survey, 2 miles southwest of the West Chico field, which was drilling in shale below 4,680 ft. Cities Service Oil Co. narrowed the gap between the original field and the western area at its 7 Sealy, Block 3, GH&H Survey, when it completed for 252 bbl. of oil a day from the conglomerate at 5,263-93 ft. Gas-oil ratio was 1,950 cu. ft.

Cities Service 1 Ella T. -McKissick, S. Isaacs Survey, a wildcat 3 miles southwest of Decatur, was drilling below 6,047 ft. A 1-hour drill-stem test at 5,829-66 ft. recovered gas and 60 ft. of drilling mud.

Mid-Continent Petroleum Corp. 1 McBride, W. Burke Survey, 2 miles south of Paradise, was drilling in shale below 5,484 ft. No shows have been reported.

In Cooke County, Snuggs & Neal, Inc., 1 G. A. LeMaster, Block 2, League 7, University Lands Survey, 10 miles northeast of Gainesville, reported a show of oil in an unidentified lime section from 5,099-5,114 ft., and a show of oil shale from 5,114-17 ft. An hour drill-stem test, which apparently covered both sections, recovered 1 gal. of free oil, 690 ft. of gas and 40 ft. of slightly oil-cut drilling mud. Drilling continued below 5,120 ft. Northeast of Wood Burk Royalty Co. 1 J. F. Parks, H. Baker Survey, was drilling near 3,000 ft.

Twelve miles northwest of Throckmorton, Cities Service Oil Co. and Sinclair Prairie Oil Co. 1 SMS Ranch, Block 100, BBB&C Survey, recovered oil on two drill-stem tests in the Caddo. Top on the formation was 4,922 ft. The first 1-hour test, from 4,926-40 ft. recovered 70 ft. of heavily oil-cut drilling mud plus 30 ft. of oil-cut mud. Bottom-hole pressure was 1,700 psi. Operators then cored from 4,940-68 ft., recovering 3 ft. of shale and 24 ft. of lime having a good odor of oil and fluorescence.

The second test was run from 4,936-68 ft., which recovered 180 ft. of heavily oil and gas-cut mud, plus 90 ft. of mud. Bottom-hole pressure was 1,720 psi. in 20 minutes. Operators then cored from 4,968-87 ft., recovering 9 ft. of lime with oil stain, 8 ft. of shale and 2 ft. of lime with additional oil stains. It was to run another test of the lower section.

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morton County, Fred M. Manning, Inc., 1-L Goodstein-R. A. Brown, Block 215, BBB&C Survey, were swabbing the upper Caddo after acidizing perforations from 4,550-55 ft. This section had previously yielded some 1,600 ft. of oil on a drill-stem test, according to reports. Operators squeezed perforations in the lower Caddo at 4,834-39 ft. when water was recovered on a drill-stem test.

New operations reported during the week: The Texas Co. 1 J. M. Donald, wildcat 5 miles northeast of Bowie, Montague County, in the J. E. Smith Survey, A-673, drilling below 2,500 ft. on a 6,500-ft. contract; Warren Oil Corp. 3 J. T. Hamilton, Section 1661, TE&L Survey, 2 miles southwest of Murray in Young County, drilling ahead; L. T. Burns 1 Stewart-Booth, 330 ft. from north and east lines, Section 2634, TE&L Survey, a new 5,500-ft. rotary test, 4 miles northeast of Antelope in southwest Clay County; The Texas Co. 1 C. R. Miller, Section 11, Mangold subdivision, 1½ miles northwest of Mankins, Archer County, a new 5,000-ft. wildcat, drilling near 3,000 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) SUCCESSFUL WILDCATS

Eastland County: **G. E. Kadane & Sons 1** Whitesides, J. Ruvarth Sur., A-806, 8 mi. NE Rising Star, pumped 6 bbl. 42°-gravity oil a day, Marble Falls 2,740-2,817 ft., TD 2,829 ft.

National CoOp Refining Co. 1-A Eunice Krell, Sec. 66, Blk. 2, H&TC Sur., 4 mi. NE Gorman, flowed 22 bbl. 40.6°-gravity oil a day, 48/64-in. choke, perforated 2,656-64 ft., TP 55 psi., GOR 2,000 cu. ft., TD 3,066 ft.

Palo Pinto County: FOB Oil Co. 2-A S. B. Cantey, Sec. 25, Blk. 3, T&P Sur., 3 mi. E Brad, pumped 8 bbl. oil, 300 bbl. water a day, Ellenburger 4,240-90 ft., TD.

Haskell County: Pan American Oil Producing Co. 1 W. G. Wendeborn, A. F. Buchard Sur. 42, A-14, 3 mi. SE Sagerton, flowed 68½ bbl. 40°-gravity oil in 20 hours, perforated 4,772-80 ft., TD 4,784 ft.

NORTH CENTRAL TEXAS (DISTRICTS 9 & 7-B) WILDCAT FAILURES

Archer County: Bridwell Oil Co. 2 R. Campbell, Sec. 1379, TE&L Sur., 5 mi. SE Anarene, dry, TD 1,033 ft.

W. B. Hamilton 1 J. S. Prideaux, H. Pearce Sur., 12 mi. SE Archer City, dry, TD 3,505 ft. in shale and lime.

Hassie Hunt 1 Clemmie Wells, W. M. Hassell Sur., 2 mi. E Archer City, dry, TD 4,020 ft.

Callahan County: Star Oil Co. 1 S. J. Tarrant, James O. Young Sur., 3 mi. SW Clyde, dry, TD 2,605 ft.

Clay County: P. P. Langford, Jr., 1 C. R. Henderson, R. R. Brown Sur., A-14, 5 mi. NE Byers, dry, TD 2,485 ft.

Jack County: Davon Oil Co. 1 W. E. Crow, Moses Allen Sur., A-9, 1½ mi. N Vineyard, dry, TD 5,508 ft., Caddo 4,552 ft., conglomerate 4,620 ft., show of oil 4,864 and 5,338 ft.

Nolan County: Fred M. Manning, Inc., 1 R. C. Watt, Sec. 192, Blk. 64, H&TC Sur., 1½ mi. SW Hylton, dry, TD 6,147 ft., Dotham 3,073 ft., Flippen 3,736 ft., reef lime 4,548 ft., Capps lime 5,340 ft., Caddo 5,854 ft., Ellenburger 5,970 ft., elev. 2,383 ft.

Shackelford County: Oil Well Drilling Co. and W. J. Weaver 1 W. C. Godwin, Sec. 18, BAL Sur., 2½ mi. SE Albany, dry, TD 4,586 ft., Caddo 4,035 ft., Marble Falls 4,252 ft., Chester 4,472 ft., Chappel 4,517 ft., Ellenburger 4,550 ft., elev. 1,384 ft.

West Central Drilling Co. 2 L. N. Brown, Blk. 4, League 128, Jose Gabo Sur., ¾ mi. NW Tye, dry, TD 2,887 ft., Valera 1,030 ft., Dotham 1,920 ft., Noodle 2,042 ft., Saddle Creek 2,290 ft., coal 2,318 ft., Flippen 2,340 ft., Swastika sand 2,765 ft., elev. 1,810 ft.

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EASTERN TEXAS

Navarro Test Makes Short Flow After Shut-In

DALLAS. — Nelson & Edward Morris, Ltd., 1 E. F. Bain, Richard D. Newman Survey, 3¾ miles east of Bazette in Navarro County, made a short flow after being shut in for a week. Tubing pressure at the start was 900 psi. Operators then swabbed the Woodbine perforations at 3,301-04 ft., recovering an estimated 20 bbl. of 39°-gravity oil in 6 hours, at which time it yielded only mud with a salt-water cut and only a slight show of oil. Operators believed the salt water was coming from a faulty cement job of lower Woodbine perforations at 3,369-72 ft. and prepared to resqueeze.

Humble Oil & Refining Co. 1 J. W. Minton, 9 miles northeast of Hemphill in Sabine County, was mixing mud after losing returns at 6,535 ft., total depth. Barnsdall Oil Co. 1 East-Pickering Lumber Co., W. J. Crane Survey, 6½ miles east of Shelbyville, Shelby County, prepared to drill ahead after a 1-hour drill-stem test of the Gloyd section from 5,627-60 ft. recovered nearly 4,000 ft. of salt water and 180 ft. of gas-cut mud.

Humble 1 Everett Wintters, southeast of Red Springs in Smith County, was attempting to pull tubing after cutting at 9,303 ft. Magnolia Petroleum Co. 1 L. W. Pierce, Lindsay Mann Survey, northeast of Mt. Sylvan, was drilling shale and lime below 8,869 ft. after recovering fish at 2,436 ft. It topped the upper Glen Rose at 7,980 ft. Elevation is 571 ft.

In Bowie County, Gulf Oil Corp. 1 John Veach, Jacob McFarland Survey, was drilling below 7,103 ft. in sand and shale. It had top of the Pettit oolitic lime at 6,360 ft., and probable top of the Travis Peak at 6,490-6,500 ft.

Stanolind Oil & Gas Co. 1 Tom and Wal-

ton Deupree, Henderson County test 5½ miles southeast of Athens, moved off the rig. Total depth was 11,728 ft., plugged back to 10,304 ft., corrected. Swabbing Rodessa perforations at 10,222-278 ft., down to 6,800 ft., the recovery was mud, acid water, and a very slight show of gas.

In Long Lake field, Anderson County, Tide Water Associated Oil Co. and Seaboard Oil Co. of Delaware redrilled the 1 J. O. & Hugh Monnig, Simon Sanchez Survey, 9 miles southwest of Palestine and on the south side of the field, and discovered a new pay in the Rodessa. The well was originally drilled, dry, to 9,966 ft. in 1937. Operators cleaned it out to 9,958 ft., ran electrical surveys, and started perforating and testing down the hole from 8,958 ft. With plug at 8,907 ft., perforations were made at 8,847-53, 8,865-71 and 8,885-91 ft. A drill-stem test of all perforations registered a surface pressure of 500 psi. in 1 minute, and a shut-in pressure of 2,800 psi. in 5 minutes. It flowed an estimated 3,000,000 cu. ft. of gas a day, plus 15 bbl. of distillate per 1,000,000 cu. ft. of gas.

Further tests proved the lower sets of holes were nonproductive and completion was from 8,847-53 ft. Initial production was 1,500,000 cu. ft. of gas a day and 24 bbl. of distillate per 1,000,000 cu. ft. Pressures on tubing and casing were 645 and 750 psi. Open flow was estimated at 10,000,000 cu. ft. daily. Lone Star Producing Co. made connections to the well.

EAST TEXAS (DISTRICTS 5 & 6) WILDCAT FAILURE

Falls County: V. F. Earls 1 T. S. Kelly, Pedro Salinas Sur., 1½ mi. E. Reagan, dry, TD 1,983 ft. in shale, no shows.

MICHIGAN

Trent Discovery Good for 90 Bbl.

MOUNT PLEASANT. — The Trent field discovery well, Muskegon County, was completed this week good for 90 bbl. of oil, plus a 10 per cent water cut. Wildcat was believed to be producing at near-capacity at this flow rate.

Three other tests in this area were in the Traverse lime objective and only one of these appeared to offer prospect of being a successful completion. Rex Oil & Gas Co. 3 Herman, NW SW NE 19-10n-13w, nearly ½ mile to the northwest, was reported to be pumping about 25 bbl. of oil a day from a Traverse pay following acidization with 800 gal. at a total depth of 2,049 ft., 10 ft. in the objective. A small water cut was reported showing with oil from this well.

August Busk 1 Herman, SE NW NE 19-10n-13w, south offset to the Rex 3 Herman, was shut down in the Traverse at 2,067 ft. awaiting orders. No shows of either oil or water were reported up to this point, 30 ft. in the section.

Rex 2 Herman, SE NE NE 19-10n-13w, north offset to the Degenther discovery, was being completed in the objective lime with commercial prospect doubtful. General outlook for a sizeable Traverse oil field in this district appeared dim after 3 weeks of testing and the drilling of three follow-up test holes.

A shift in drilling activity from western and southwestern Michigan back towards the basin area was noted this week with the approval of 15 new permits by the Department of Conservation. All but one of the newly announced starts were for the basin province. All but four of the new drilling permits were for field development tests.

MICHIGAN SUCCESSFUL WILDCAT

Muskegon County, Casnovia Township: P. K. Degenther 1 Herman, SE SE NE 19-10n-13w, Traverse 2,038 ft., 90 bbl., 10 per cent water after acidization, TD 2,042 ft.

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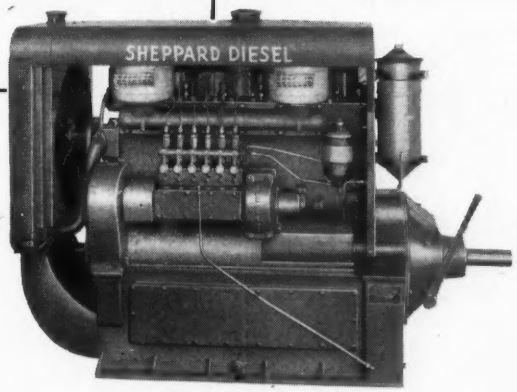

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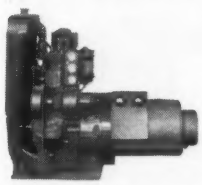

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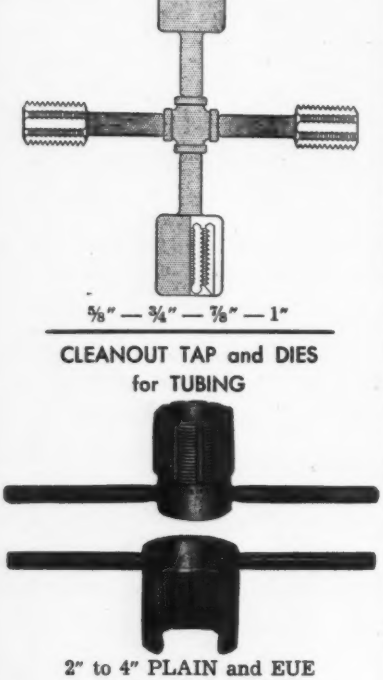

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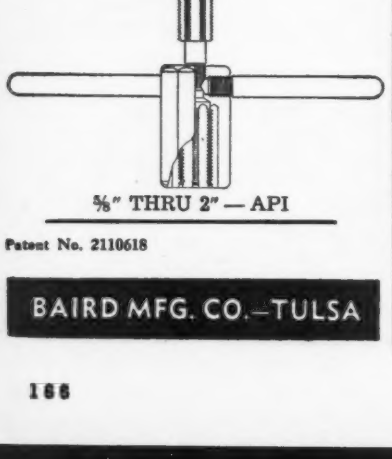

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MICHIGAN WILDCAT FAILURES

Allegan County, Clyde Township: Ohio Oil Co. C.T. A-23 U. S. of America, NE NE NW 34-2n-15w, dry in Traverse, TD 1,226 ft.

Clyde Township: Ohio Oil Co. C. T. A-24 U. S. of America, SW SW SE 28-2n-15w, dry in Traverse, TD 1,256 ft.

Lee Township: Ohio Oil Co. 1 Reed, SE NE SW 9-1n-15w, dry in Traverse, TD 1,272 ft.

Arenac County, Adams Township: W. L. McClanahan 1 State-Adams, NE NE SE 2-19n-3e, dry in Dundee, TD 3,120 ft.

Kalkaska County, Clearwater Township: Sun Oil Co. 1 Brunn, NE SW NE 6-26n-5w, dry in Detroit River, TD 4,623 ft.

Kent County, Gaines Township: Busk & Van Dellen 1 Wiersma et al, NW NE SW 8-5n-11w, dry in Traverse, TD 1,910 ft.

PERMIAN BASIN

Reagan County Wildcat Tests Silurian Pay

MIDLAND.—Stanolind Oil & Gas Co. and Danciger Refining Co. 1 E. Price Miller, 3 miles east of the town of Big Lake, was showing for a discovery in the Fusselman section of the Silurian. Early in the week the well flowed 244 bbl. of 43°-gravity oil in 14 hours, through open 2-in. tubing. It was swabbed in after treating with 5,000 gal. of acid through casing perforations at 9,335-85 ft. Gas-oil ratio during the flow ranged from 1,200-1,500 cu. ft.

The 14-hour flow was variously reported to have averaged from 14-17 bbl. of oil an hour, until the last hour, which yielded 5½ bbl. of oil. Following the test, operators pulled the packer and found water above it, which killed the oil flow. Water in the hole was to be replaced with oil and circulated and swabbed in an effort to revive the flow. The well was drilled to 9,799 ft., in the Ellenburger, which had no shows, and plugged back to 9,590 ft.

Location is 660 ft. from south and 2,011 ft. from west lines of the northwest quarter, Section 226, Block 1, TP Survey, Reagan County. It is about 3 miles northwest of 9,100-ft. Ellenburger production in the Barnhart field. Other majors holding acreage in the area are: Texas Pacific Land Trust Co., Mid-Continent Petroleum Corp., Humble Oil & Refining Co. and The Texas Co.

A fourth pay for the Benedum field was believed to have been found at Plymouth Oil Co. 1-46 Artisse Elliott, Section 46, Block Y, MK&T Survey, on the Reagan County side. Perforations in casing at 9,405-10,616 ft., have been tentatively identified as being in the Bend zone of the Pennsylvanian, which is the entire group of shales and lime underlying the Strawn. The well flowed 235 bbl. of 50°-gravity oil in 24 hours through ⅜-in. choke. Tubing pressure was 1,050 psi. and casing pressure was 450 psi. Location is 1½ miles northeast of the nearest producer on the Upton County side.

In Scurry County, 2 miles northwest of the Dermott (or North Snyder) Canyon lime field, Lone Star Producing Co. 1 Maule had prospects of production in what has been tentatively identified as the lower Canyon, or possibly the Strawn. A drill-stem test, open 2 hours, from 7,035-80 ft., showed gas at the surface in 6 minutes and recovered 2,250 ft. of mud-cut oil. Operators then drilled to 7,190 ft. where electric surveys were to be run before setting pipe. Location is 660 ft. from south and east lines of Section 451, Block 97, H&TC Survey, and 3 miles east and slightly north of the town of Dermott.

In the Dermott field, Standard Oil Co. of Texas 1-3 Mrs. Jessie W. Brown became the second producer. It flowed 64 bbl. of oil in 1 hour on a drill-stem test from 6,498-

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6,550 ft., said to represent an additional 102 ft. of pay over that logged earlier in the week. The 1-3 Brown is a south offset to the discovery. Standard's 2-2 Brown, ½ mile east of the discovery, prepared to drill-stem test from 6,582-6,630 ft.

In Tom Green County, Plymouth Oil Co. 1 John D. Robertson became the second producer in the Susan Peak field, southeast of San Angelo. On a 24-hour gage, the well flowed 410 bbl. of oil through ¼-in. choke, from open hole at 4,730-54 ft. The 1 Robertson is 760 ft. from north and 660 ft. from east lines of Section 193, District 11, Southern Pacific Railway Survey, and a ⅜-mile northeast offset to the 1 Green discovery. It was also said to be some 19 ft. lower structurally than the discovery. Rig was skidded to location for the 2 Robertson, 880 ft. from north and 660 ft. from west lines of Section 194, District 11. Plymouth's 2 J. Wiley Green, ⅜ mile southeast of the the discovery, was below 3,170 ft.

In Midland County, The Texas Co. 1 Scharbauer, Ellenburger prospect, made one of its best recoveries in swabbing at 13,049-139 ft., in the top of the formation. Swabbing and flowing, it recovered 139 bbl. of oil, plus 19 bbl. of water, in 23 hours. The section had been treated with 500 gal. of acid. Operators believed the water was coming from below the section being tested. Swabbing and flowing continued.

A 1-mile west extension to the South Cowden field was completed by Amerada Petroleum Corp. at its 1-F TXL, Section 5, Block 43, T&P Survey. It gaged 138 bbl. of oil a day, on the pump, after acidizing through casing perforations from 4,140-85 ft. H. L. Hunt 1-B Clayton & Johnson, Borden County wildcat 10 miles northwest of Gail, reported additional showings of oil samples from 6,422-32 ft. From 6,433-48 ft., coring recovered a 7-ft. section of lime and sand with water; from 6,536-48 ft. drill samples showed oil, and a core from 6,548-61 ft. recovered 7 ft. of tight, gray shaly sand with streaks of oil stain and fluorescence and some water. A drill-stem test had not been made on last report. Last week the well was said to have recovered 270 ft. of clean oil on a test from 5,749-59 ft.

WEST TEXAS (DISTRICTS 8 & 7-C) WILDCAT FAILURES

Gaines County: C. H. Osmond 1 W. T. Morris, Sec. 17, Blk. C-33, PSL Sur., 4 mi. E, 1 mi. N Seagraves, dry, TD 5,770 ft., salt 2,472 ft., Yates 3,450 ft., San Andres 5,120 ft., elev. 3,351 ft.

Terrell County: Humble Oil & Refining Co. 1 J. C. Mitchell, Sec. 24, Blk. 128, T&STL Sur., 30 mi. NW Sanderson, dry, TD 12,074 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—Magnolia Petroleum Co. 1 Cox-Federal, 1-9s-36e, 4¼ miles northeast of the Crossroads field, Lea County, was drilling ahead below 10,796 ft. This well which has attracted considerable interest, was reported to be running high to the discovery well of Sawyers field. Correlated with the discovery of Crossroads, it was 500 ft. higher on the Pennsylvanian at 9,010 ft., and flat on the upper formations.

Mid-Continent Petroleum Corp. 1 Dessie Sawyer, northwest extension to Crossroads field in 27-9s-36e, was waiting on cement after setting 5-in. casing to 12,218 ft. Total depth is 12,231 ft., by electrical survey.

Skelly Oil Co. 1 U. D. Sawyer, 33-9s-36e, prepared to core below total depth of 12,599 ft. A drill-stem test from 12,468-586 ft., using 4,000 ft. of water blanket, produced a slight blow of air for 40 minutes, and recovered the water blanket only, with no shows. Top on the Devonian had not been reported by operators, but observers believed it was in that formation.

SOUTHEAST NEW MEXICO WILDCAT FAILURE

Chaves County: Barnsdall Oil Co. 1-A State, NE NE 23-8s-32e, dry, TD 12,040 ft., anhydrite 1,860 ft., San Andres 3,555 ft., Glorietta 4,850 ft., Clear Fork 5,600 ft., Tubbs 6,140 ft., Abo 7,290 ft., Pennsylvania 8,400 ft., Mississippian 10,785 ft., igneous 11,994 ft., elev. 4,459 ft.

MISSISSIPPI

Scattered Development Marks Quiet Week

JACKSON.—Gulf Refining Co. 14 Bass, 8-1n-16w, in Baxterville field, Lamar County, has been completed flowing an initial production of 110 bbl. of 18.5°-gravity oil per day through a 3/32-in. choke, tubing pressure 500 psi. Total depth is 8,784 ft., with perforations from 8,754-86 ft.

In Cranfield field, Adams County, The California Co. 29 Ella G. Lees, 52-7n-1w, was drilled to a total depth of 4,370 ft., and flowed on potential test 84 bbl. of 31.5°-gravity oil per day through a ¼-in. choke, through perforations at 4,362-70 ft.

Gulf 5 Geo. F. Taylor, 27-1n-12e, in Heidelberg Field-West, Jasper County, was completed pumping 108 bbl. of 19°-gravity oil through perforations at 5,065-79 ft. Total depth is 5,176 ft.

Danciger Oil & Refining Co. 1 Ed Gatlin, 14-9n-8w, in Yellow Creek field, Wayne County, has been completed on pump for 120 bbl. of 20°-gravity oil per day. Production is through perforations at 5,120-36 ft., and 5,045-59 ft.

One wildcat start was reported for Lawrence County, and 5 development locations were shown, 1 each in Bude, Cranfield, Eucutta, Hub and Mallalieu fields.

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Illustration shows double fork feeding into fulcrum arm from both sides.

Long service and steadiness is assured, and uneven wear on bearings is prevented by two support bearings. Five rings of heat-resistant gasoline packing prevent leakage. Weight on the swing rests on the outboard bearings and the joint itself does not rest on the packing. Swings at all angles.

The tank truck loader shown, Model 600-D, meets every loading demand of the industry. The bronze angle swing joint swings in 360-degree radius, permitting dip pipe to enter dome from any angle, with handle on the joint to enable operator to adjust sliding sleeve to desired position. Counter-balanced weights allow the loader to remain in an upright position when not in use. Vacuum control completely drains the assembly upon raising it from truck.

Complete descriptions in Oilco catalog No. 500.

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ROCKY MOUNTAIN

Tensleep Saturation In Fremont Co. Test

DENVER.—Saturation was found in cores in the Tensleep at Atlantic Refining Co. 1 Tribal, C SW SE 25-1s-4e (WRM), in the Riverton area, Fremont County, Wyoming, and the company is now preparing to dril.-stem test in that formation. Top of the Tensleep has tentatively been placed at 11,661 ft. and cores between 11,670-11,714 ft., total depth, showed saturation. The well is 6 miles north of the Beaver Creek field, where Stanolind Oil & Gas Co. recently tested oil in the top of the Tensleep but found a large portion of that sand hard and tight with little porosity. Atlantic recovered gas in the Frontier formation and gas and distillate in the Phosphoria lime in the present well. Location for the present test was made following extensive seismic activity in this area.

Indication of a new pay formation, the Phosphoria, for the Golden Eagle field was shown with a 5,040-ft. oil recovery on drill-stem test at 1 Golden Eagle, NW SE SW 12-45n-97w, Hot Springs County, Wyoming. The well is being drilled by Phillips Petroleum Co. on a farm-out arrangement with Pioneer Oil Corp. of Denver. Top of the Phosphoria was logged at 9,055 ft. and the first test was made between 9,055-9,075 ft. In 1 hour the well made the 5,040 ft. of 42°-gravity oil and 90 ft. of oil-cut mud. Gas was recovered at the surface in 35 minutes. Additional tests are now being made in the Phosphoria at 9,095 ft., total depth, prior to drilling the well into the Tensleep for a test of that formation. This field was discovered in 1918 when a well recovered gas in a sand in the Mesa Verde at around 3,000 ft. Gas was depleted by 1933 and in 1944 Pioneer drilled a Muddy sand well to 6,794 ft., and this well is still productive of gas and distillate from that formation. In 1945 Pioneer drilled a well to the Morrison at 7,379 ft., total depth, and discovered oil in the Lakota. The present well is the first below the Morrison in the field. This field is 15 miles northwest of Gebo and 8 miles northwest of the Little Sand Draw field, where Seaboard Oil Co. and Husky Refining Co. are now testing for completion on a Tensleep discovery well.

Pure Oil Co. has abandoned its wildcat on the Northeast Salt Valley Unit in the SW SE NW 2-23s-20e, Grand County, Utah, at 3,036 ft., total depth, probably in the Paradox formation. On drill-stem test between 2,540 and 3,036 ft., the well made 58 ft. of mud in 1 hour. No shows were reported for the wildcat. The well is on the northeast side of the large Salt Valley anticline, where several wells have had shows of oil in the Paradox fractured zones. Pure has additional acreage on the structure and may plan additional drilling in the area.

Tide Water Associated Oil Co. cored streaked saturation in lime, probably lower Hermosa, at 74-11, NW NW SW 11-26s-19e, on the Big Flat Unit, Grand County, Utah. On drill-stem test at 3,449-3,480 ft. the well made only 30 ft. of oil-cut mud in 45 minutes. The operator is drilling below 3,600 ft. This well is located on the southwest side of the Salt Basin, and Tide Water Associated did geological and geophysical work in the area prior to locating the present well. The well is scheduled to test Mississippian at around 7,000 ft.

Stanolind has abandoned its 1 Unit, C SE NE 8-55n-100w, in the Big Sand Coulee area, Park County, Wyoming, at 13,477 ft., total depth, in the Madison. Slight shows of oil were found in cores in the Phosphoria and Tensleep formations, but these failed to produce on tests. The well was located following seismic surveys along the northwest side of the Big Horn Basin, between the Oregon Basin and Silver Tip fields.

New locations.—There were 9 new locations, including 5 in Wyoming, 3 in Colorado and 1 in Utah. At Sussex in Johnson County, Wyoming, Continental Oil Co. made location 2½ miles southeast of previous production. It is reported this well is located on a separate high on the Sussex anticline, and that faulting exists between the new location and the field proper. Noble Drilling Co. is moving in rotary for the well, which is in the SE SW NW 23-42n-78w.

Completions.—Wyoming led in the Rocky Mountains with 11 completions during the week and Colorado, Montana, and northern New Mexico each had one. Total daily initial for the wells was 3,311 bbl. of oil. There were 6 wildcat failures in Wyoming. W. H. Barber Co. et al abandoned the East Derby wildcat after failing to find production through the Madison. Sand Draw Oil Co. and Trigood Oil Co. plugged the North Sand Draw widcat after Frontier formation was found lower than expected. Sinclair Wyoming plugged back its first Madison well at Sand Draw, Wyoming, as a Tensleep producer after failing to find production in the Madison. The Montana failure was General Petroleum Corp.'s Freedom Dome wildcat, which went to 9,018 ft., total depth, with Cambrian at 8,070 ft.

WYOMING WILDCAT FAILURES

East Derby, Fremont County: W. H. Barber Co. et al 1 Govt., NE NE NE 4-31n-98w, 3,189 ft. TD, dry, Embar 2,014 ft., Tensleep 2,350 ft., Amsden 2,910 ft., Madison 3,055 ft.

North Sand Draw, Fremont County: Sand Draw Oil Co. and Trigood Oil Co. 1 Bewley, SE SW NW 27-33n-95w, 4,768 ft. TD, dry, Frontier 4,328 ft., first Frontier 4,336 ft., second Frontier sand 4,680 ft.

Northeast Horse Creek, Laramie County: B. B. Carter and Ben Beck 1 Nimmo, SW SE SE 7-17n-67w, 5,753 ft. TD, Mesa Verde 5,515 ft.

Kummerle, Weston County: E. K. Carey et

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al 1 Govt., NE NE NE 23-45n-65w, 5,568 ft. TD, Newcastle 5,173 ft., Dakota 5,370 ft., Lakota 5,510 ft.

Lodgepole, Schlaikjer Bros. 1 Govt., C SW SW 10-44n-66w, 6,975 ft. TD, dry, Newcastle 6,454 ft., Dakota 6,651 ft., Lakota 6,809 ft., Morrison 6,860 ft.

MONTANA WILDCAT FAILURE

Freedom Dome, Garfield County: General Petroleum Corp. 5-25-P, NW NW SW 25-16n-38e, 9,018 ft. TD, dry, Amsden 4,935 ft., Big Snowy 5,280 ft., Kibbey 5,535 ft., Charles 5,790 ft., Madison 6,522 ft., Devonian 7,370 ft., Cambrian 8,070 ft.

NORTHERN NEW MEXICO WILDCAT FAILURE

Jemez Dome, Sandoval County: Tide Water Associated Oil Co. 1 Espiritu-Santo, NW NE SW 7-16n-1e, 2,560 ft. TD, dry, Pennsylvanian 1,911 ft., granite 2,477 ft.

CALIFORNIA

New Fault Block Strike At Belgian Anticline

LOS ANGELES.—A new fault block discovery has been made in the Belgian anticline area, Kern County, by Pacific Western Oil Corp. The company's 14-30 Midway-McKittrick A, Section 20-20s-22e, has been completed flowing 4,000,000 cu. ft. of gas through a 25/64-in. choke from the interval 5,220-5,320 ft. The gas is reported to be wet and later drilling will likely reveal the presence of an oil accumulation below the gas. The discovery is 1 mile west of this operator's Eocene "84" pool in the Belgian anticline field which is producing 35°-gravity oil from approximately 5,200 ft. The new producer represents the sixth discovery in the Belgian anticline area in the last 2½ years.

Hancock Oil Co. has extended production in the White Rock area of Russell Ranch field in the Cuyama Valley. The company ran a formation test on its 22-25 Wood-Callahan, 25-11-n-28w, and with the tester open 1 hour and 10 minutes recovered 540 ft. of 34°-gravity clean oil from interval 2,909-27 ft. The well is approximately ¾ mile northwest of the nearest production in the White Rock area. The discovery follows by a week the discovery of a new pay zone west of the White Rock area by Richfield Oil Corp., and lends support to the belief that Russell Ranch field is one of the most important found in California in many years. Latest test location to be recorded in the Cuyama Valley is Humble Oil & Refining Co. 1 Eugene N. Wegis et al on Section 28-9n-25w. This is a rank wildcat about 16 miles southeast of Russell Ranch production.

Developments in the Newhall area of Los Angeles County during the last week have been inconclusive. Two wells presently undergoing tests have failed to show any oil so the R. W. Sherman 3-1 Newhall Community, 25-4n-16w, continues to be the only producer and the water cut in this well has shown an increase in the last fortnight. However, the area is badly broken up geologically and there is a disposition not to condemn it on the basis of results to date.

Two wildcats will get under way soon in the San Ardo area of Monterey County. Superior Oil Co. is grading location for 1 Orradre, 6-23s-11e, a northeastern extension test of San Ardo field, about ½ mile from Jergins-North American Orradre production. The Texas Co. is preparing to drill 7 Rosenberg, 2-23s-10e, ¾ mile northwest of the Jergins-North American Ferrini production.

CALIFORNIA SUCCESSFUL WILDCAT

San Luis Obispo County, Russell Ranch area: Richfield Oil Corp. 18-30 Anderson, 30-11n-28w, flowed 1,320 bbl. daily through ½-in. choke, gravity 37.8°, water cut 0.5 per cent, from Temblor-Vaqueros interval 3,512-62 ft., elev. 1,801 ft., TD 3,642 ft.

CALIFORNIA WILDCAT FAILURES

Kern County, Round Mountain area: Continental Oil Co. 1 Tarabino, 5-29s-29e, dry, elev. 415 ft., Pyramid Hills 2,690 ft., upper Vedder 2,840 ft., lower Vedder 3,060 ft., TD 3,080 ft.

Ant Hills area: Independent Exploration Co. 1 Clarke, 20-29s-29e, dry, elev. 733 ft., Santa Margarita 1,120 ft., TD 1,254 ft.

Edison area: Independent Exploration Co. 1 Moeller, 18-30s-29e, dry, elev. 469 ft., Hood zone 3,882 ft., Transition 3,920 ft., Santa Margarita 4,000 ft., TD 4,033 ft.

Lerdo area: Morton & Sons 1-25 Lerdo, 25-28s-26e, dry, elev. 528 ft., TD 6,436 ft.

Round Mountain area: George Terry Drilling Co. 14-1 Bishop, 14-28s-28e, dry, elev. 1,203 ft., TD 2,568 ft.

Monterey County, San Ardo area: Superior Oil Co. 1 Cooper, 6-21s-9e, dry, elev. 345 ft., TD 445 ft. in basement.

Los Angeles County, Gorman area: Pine Canyon Oil Co. 1 Davidson, 26-8n-18w, dry, elev. 3,600 ft., TD 2,800 ft.

Santa Barbara County, Los Olivos area: Union Oil Co. 1 Dabney, 7-7n-30w, dry, elev. unknown, TD 3,358 ft.

APPALACHIAN FIELD

New Wildcat Test Located in Grant District

PITTSBURGH.—In Grant district, Jackson County, West Virginia, United Carbon Co. et al located 1-1622 L. C. Sheppard

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et ux, elevation 856 ft., for a new wildcat test. This well is approximately .75 mile east of the Waterbury discovery well and is located on the Belleville quadrangle 4.35 miles south of Lat. 39°, 5′ and 4.5 miles west of Long. 81°, 30′. In this same section, but in Steele district, Wood County, Godfrey L. Cabot, Inc., 1-1282 Jacob Gates, elevation 1,035 ft., reported the Corniferous lime being topped at 5,107 ft. and the 5-in. casing set at 5,125 ft.; United Carbon Co. 2-1582 Godfrey L. Cabot, Inc. (Kerr tract), is drilling at 3,150 ft. In Kingwood district, Preston County, Hope Natural Gas Co. 9209 Frank Barlow, elevation 2,235 ft., is drilling at a depth of 8,256 ft., or 252 ft. below the top of the Onondaga chert.

New locations reported in West Virginia were 23: Grant and Ravenswood districts, Jackson County; Harts Creek and Washington districts, Lincoln County; Trap Hill district, Raleigh County; Clay district, Ritchie County; Grant, Stonewall and Union districts, Wayne County; Walker district, Wood County; and Oceana district, Wyoming County.

In Napier Township, Bedford County, Pennsylvania, South Penn et al-Snee & Eberly 1 Jesse B. Miller, elevation 1,666 ft., is drilling at 2,224 ft. In Elder Township, Cambria County, Peoples Natural Gas Co. 3831 Clearfield Bituminous Coal Co. is at 3,677 ft. In Derry Township, Westmoreland County, this company's well No. 3814 Camilia Giffin is drilling at 8,135 ft. and in Unity Township its 3830 Wm. Piper is at 6,480 ft.

New locations reported in Pennsylvania were three: Kiskiminetas Township, Armstrong County: Washington Township, Indiana County; and Washington Township, Westmoreland County.

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TEXAS GULF COAST

New Wilcox Pool For Newton County

HOUSTON.—A new oil pool for Newton County, approximately 8 miles southeast of Call, has been opened by The Texas Co. 1 Newton County Lumber Co. On initial test the well flowed at the rate of 60 bbl. of oil per day through a ¼-in. choke. Drilled to a total depth of 12,610 ft., the well was plugged back and completed through perforations from 9,644-9,660 ft. in the Wilcox. Tubing pressure 240 psi., gas-oil ratio 1,600, and gravity 44°. This new production is approximately 5 miles from the nearest Texas oil field, and the nearest production in several miles across the Sabine River in Louisiana.

Sun Oil Co. is opening a new field in Galveston Bay in the Hannah Reef area, Galveston County. The 1 State - Hannah Reef, located in State Tract 232, being 8 miles north of Port Bolivar, was drilled to a total depth of 11,009 ft. It blew out of control late last year. Operators controlled the well, junk was lost in the hole. After cleaning out, the pipe was perforated from 10,674-10,688 ft., and on a ⅛-in. choke, with production packer cemented at 10,617 ft., the well began cleaning out with flowing pressure on tubing at 4,500 psi. The choke was changed to a 10/64-in. and then to a 12/64-in., and the tubing pressure had leveled off at 3,800 psi. The flow was estimated to be approximately 150 bbl. of yellow fluid daily, showing 0.3 per cent mud. Hole continues to clean.

Lonnie Glasscock 1 Holder, deep wildcat well, 1½ miles southwest of the East Long Mott field, in Calhoun County, is reported swabbing 28 bbl. of oil per day. On drill-stem test through perforations at 9,375-90 ft., using ¼-in. chokes, recovered 1,800 ft. of oil-cut mud and 300 ft. of 38°-gravity pipe-line oil. Perforations at 9,332-42 ft. recovered 6,000 ft. of oil-and-gas-cut mud in 6½ hours with no pressure; and perforations at 9,230-72 ft. recovered 2,100 ft. of pipe-line oil with 12 psi. working pressure in 11½ hours, through ¼-in. chokes.

The Texas Co. 2 Emma Holzmark, southwest extension well at the Holzmark-Wilcox field in Bee County, has been gaged at 102 bbl. of 28.3°-gravity oil per day through a ⅛-in. choke, with 1,800 psi. tubing pressure, casing sealed. Gas-oil ratio 5,070. Production is through perforations at 8,129-31 ft. This well is located in E. C. White Survey.

Districts 2 and 3 received 32 new locations, with 8 being wildcat starts, 2 each in Jackson and San Jacinto, and 1 each in Bee, Live Oak, Matagorda, and Wharton counties. One successful wildcat opened a new oil pool in Brazoria County while 5 wildcats were dry, 2 in Victoria, and 1 each in Brazoria, Gonzales and Liberty counties.

TEXAS GULF COAST (DISTRICTS 2 & 3) SUCCESSFUL WILDCAT

Brazoria County: New oil pool:—Hassie Hunt, Tr. 1 H. H. Stowe, in B. C. Franklin Lge. A-192, 3 mi. NE of Sweeny townsite and approximately 2 mi. N of Old Ocean production, TD 11,030 ft., top sand 10,656 ft., perf. 10,691-697 ft., IP: 110 bbl. oil per day through 5/64-in. choke, GOR 2,370, TP 2,720 psi., gravity 53.9°.

TEXAS GULF COAST (DISTRICTS 2 & 3) WILDCAT FAILURES

Brazoria County: C. J. Foster et al 1 G. J. Freeland, in H. Austin Lge. 4, dry, TD 751 ft.

Gonzales County: Newman Bros. Drlg. Co. and American Republics Corp. et al 1 Andrew S. Billings, Jr., in Peter Winn Sur., A-464, 2½ mi. SE of Smiley, dry, TD 6,042 ft.

Liberty County: Wm. Hebert Hunt Tr. 1 Mrs. A. Meacham et al, T&NO Sur.

A-650, Sec. 4, 4½ mi. SE of Devers, dry, TD 8,152 ft.

Victoria County: John E. Haynes 1 Chas. Conti et al, in Manuel Zepeda Grant, 3½ mi. NW of Victoria, dry, TD 6,510 ft.

Progress Pet. Co. of Texas 1 Hulda Horadam, in Manuel Zepeda Grant, A-128, 7 mi. S-SW of Victoria, dry, TD 4,620 ft.

ILLINOIS

Good Cypress Well For Wabash County

MATTOON.—Calvert & Willis, Mahutska Oil Co., and Central Pipe Line have completed 1 J. W. Reisinger, SE NE NE 4-2s-13w, Wabash County, with an initial pumping production of 330 bbl. per day from the Cypress at 2,401-12 ft. The well was reported to have swabbed 250 bbl. in the first 12 hours. It is located about ½ mile southwest of production in Maud pool where the principal pay is also the Cypress sand. The well is less than 1 mile southeast of production in West Maud pool.

George S. Engle is drilling below 2,065 ft. at 2 R. V. Stinson, NW SW SE 9-9s-9e, Gallatin County, an east offset to 1 Stinson that opened Hardinsburg production in the area at 2,119-35 ft.

In Lawrence County, George & Wrather 1 Williams, NW SW SE 9-3n-11w, had shows of oil in the Devonian at 3,224-32 ft. and 2,240-46 ft. Operator has set casing at 3,270 ft. for further tests. Total depth is 3,326 ft. The well is about 2 miles southeast of Lawrenceville.

National Associated Petroleum and Continental Oil Co. completed four oil wells last week in North Assumption pool in Christian County, currently one of the most active areas in the state. The pool has 3 pay zones—Devonian, Rosiclare, and Bethel.

In White County, C. E. Brehm has completed 1 Blackford, SE NW NE 34-3s-10e, with an initial production of 110 bbl. per day from the Cypress at 2,835-60 ft. after a 40-qt. shot. Total depth is 2,861 ft.

ILLINOIS WILDCAT FAILURES

Clay County: Calvert & Willis 1 Daubs, SW SE NW 10-3n-8e, dry, TD 3,115 ft.

Gallatin County: C. E. Skiles 1 F. J. Johnston, SE NW SE 24-7s-8e, dry, TD 3,040 ft.

Macon County: A. N. Roth et al 1 M. D. Pollock, SW SW SE 33-17n-2e, dry, TD 2,176 ft.

H. C. Herring 1 Pearich et al, SW SW SW 33-17n-2e, dry, TD 2,070 ft.

Marion County: F. E. Dingle 1 Dingle, NE SW SW 2-2n-2e, dry, TD 2,309 ft.

White County: P. O. Wall 2 Redinour, NW NE SW 35-3s-10e, dry, TD 3,270 ft.

CANADIAN FIELDS

Two New Strikes For Alberta

CALGARY.—Highlighting developments in Alberta are two oil discoveries some 30 miles apart. Imperial Oil, Ltd., fits into both discoveries, with a full interest in one, and a 50 per cent interest in the other.

Imperial-Schoepp 1, LSD 9, 22-51-27w4, about 4 miles west of the Woodbend oil field, is an oil discovery in the D3 zone of the Devonian. On a drill-stem test of interval 5,360-80 ft., the well flowed oil to the surface in 21 minutes. When the pipe was pulled, fluid recovery consisted of 3,000 ft. of 38° to 39° gravity crude oil, no water, probably assuring a good producer. Drilling will likely continue down to the water level before production string of casing is run.

The second strike is about 30 miles east and 5 miles south of the Schoepp well, in the Joseph Lake area. Superior-Joseph Lake 1, LSD 11, 22-50-22w4R, about 22 miles due east of the Leduc oil field and 18 miles southeast of Edmonton, confirmed oil success in the Viking sand at 3,266 ft.

During drill-stem test with packer set 38 in. off bottom 3,266 ft., the well flowed 35° gravity crude oil to the surface in 27 minutes. During the 1½-hour drill-stem test, the gas flow rate was between 100,000 and 150,000 cu. ft. per day. While the well was flowing oil through the ½-in. opening, recovery was about 20 bbl. of oil per hour. When the pipe was pulled, fluid recovery consisted of 1,800 ft. of oil, no formation water.

Previous tests in the Viking sand gave large flows of dry gas. Test from 3,219-39 ft. gave a dry gas flow rate of 1,700,000 cu. ft. daily. Test from 3,244-64 ft., gave a gas flow measured at 1,390,000 cu. ft. daily. Thirty minutes after the tester was opened on this second test, a flow of crude oil hit the surface. The flow continued for 10 minutes until tester was closed.

Officials are currently making decision whether to drill on to the well's original objective, the Lower Cretaccous and Devonian, or to complete as an oil well at present depth. Net interest in the Joseph Lake well and the 14-section block surrounding the site is: Imperial Oil, Ltd., 50 per cent; General Petroleums, Ltd., 15 per cent; Superior Oils, Ltd., 12½ per cent; Kroy Oils, Ltd., 12½ per cent; and Jupiter Oils, Ltd., 10 per cent.

Leduc-Woodbend.—Husky Oil & Refining, Ltd., Canadian subsidiary of Wyoming's Husky Refining Co., will commence drilling operations at two favorably located sites in the Leduc-Woodbend area in about 10 days. Both wells will be drilled by Husky-owned and operated rigs.

Husky-Woodbend 1, in LSD 1, 13-51-26w4, is ¼ mile northwest offset of the Continen-

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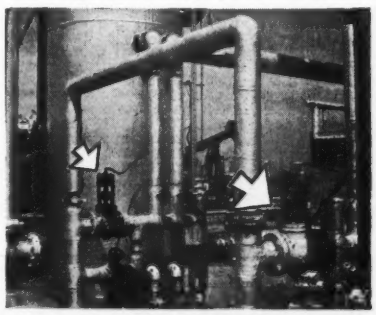

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tal-Leduc-Woodbend 6, recent Lower Cretaceous oil success. The new venture is situated on a quarter section recently acquired from the Alberta Government on a joint basis by Husky and the Vernon Hotel Co., Ltd., of Vancouved. The team will jointly develop this quarter section on a 50-50 basis. The well will go in search for production from the Lower Cretaceous horizon.

Husky-Leduc 1, in LSD 9, 24-50-27w4, is ¼ mile north of Imperial-Leduc 95, a D2 zone completion, and ¼ mile west of Imperial 74, a D3 zone producer. The Leduc test is on a quarter section farm-out from Imperial Oil, Ltd., obtained by Husky. Husky's partner in this venture is a Vancouver syndicate that will share costs and any profits that may be obtained on an equal basis with Husky.

Princess.—North Canadian Oils, Ltd., Alberta incorporation, has commenced drilling on an exploratory well about 5 miles southeast of the South Princess Madison limestone oil pool, and about 120 miles east and south of Calgary. The new wildcat, North Canadian-Princess 1, is in LSD 4, 30-18-10w4. Primary objective is the Madison limestone, looked for around 3,100 ft. Drilling may be carried on to the Devonian if commercial oil production is not found in the higher formations.

Langdon.—Sun Oil Co. of Philadelphia has reached top of the Madison limestone at its Langdon wildcat 14 miles southeast of Calgary. The well, Sun-Langdon-C.P.R. 1, in LSD 1, 3-23-27w4, confirmed top of the lime at 6,443 ft., on datum of —3,120 ft. 9⅝-in. casing has been set at 6,438 ft. with 500 sacks. The Madison is the first major objective at Langdon, the well will continue down through the Madison testing where warranted, and proceed to the underlying Devonian.

Perryvale.—Continuing its second year of an expanding oil program in Alberta, Stanolind Oil & Gas Co. has joined Decalta Oils, Ltd., a Calgary independent, for immediate drilling of a seismographed feature at Perryvale, around 30 miles northwest of the Redwater oil field in northern Central Alberta.

Stanolind-Decalta-Perryvale 1 will be drilled in LSD 14, 11-63-23w4, 2 miles southeast of Perryvale railway station, and about 60 miles north of Edmonton. Rig is now being moved in.

LEGAL

GOVERNMENT BARGE—Sealed bids will be received up to 10:00 A.M. on February 24, 1949, for a large barge approximately 100-foot length, 36-foot beam and 5-foot depth. This barge was assembled from 58 T-6, 5 T-7, 3 T-8 and 3 T-11 Navy pontoons. The motive power consists of two Murray and Tregurtha Model O Inboard Propulsion Units. It is now located on Lake Pontchartrain and its exact location can be ascertained from Mr. T. W. Serpas, President of St. Bernard Parish Police Jury, or Mr. J. Harris, Parish Engineer, Chalmette, Louisiana. It is to be sold to the highest bidder for cash as is, where is. The right is reserved to reject any or all bids. Cashier's check payable to the Treasurer of the United States for the full amount of the bid must accompany each bid. Bids must be submitted in duplicate and may be mailed or delivered to W. H. Sindt, Division Engineer, Federal Works Agency, Bureau of Community Facilities, Room 1003 Texas and Pacific Building, Fort Worth, Texas. Unsuccessful bidders' checks will be returned. Award will be made after tabulation of the bids is submitted to the Central Office in Washington, D. C.

OHIO, KENTUCKY

Good Gas Well Finished In Homerville Pool

COLUMBUS.—Another good well in Homerville pool was completed at Ditch & Gerig 1 John Nemeth, Section 17, Homer Township, Medina County. The Clinton sand at 2,786-2,800 ft. gaged 1,810,000 cu. ft. of gas natural and 3,170,000 cu. ft. when shut in after shot with a rock pressure of 950 psi. Another well in the same pool is being drilled by Ohio Fuel Gas Co. on E. L. Mantz in Section 17.

G. B. Harmon et al found another thin lens of sand at 2,291-95 ft. without any gas in their Wellington wildcat, and shot the pay horizons. When tubed and shut in, the gage was 884,000 cu. ft. of gas.

Shuff & Bucy drilled in another nice well in Bladensburg pool on 1 A. L. Rine, Section 7, Jackson Township, Knox County. A good showing in the Clinton, found at 2,921-65 ft., made 140 bbl. of oil in 24 hours after shot.

In Somerset pool, B. G. Davis et al 3 Frank Dittoe, Section 2, Reading Township, Perry County, filled 300 ft. of oil in 14 hours while drilling in and made an estimated 75 bbl. the first day after shot.

Locations are still at a low point with 10 from 6 counties reported for the week. Knox and Perry each has three while Ashland, Licking, Fairfield, and Hocking had one each. Lancaster field led in completions with 7 out of a total of 19.

OHIO WILDCAT FAILURE

Jefferson County, Salem Township: East Ohio Gas Co. 1 H. & R. Muesegaes, Sec. 22, dry, Oriskany 4,916-38 ft., TD 5,000 ft.

EASTERN KENTUCKY

ASHLAND.—In the newly discovered Bee Tree gas field of southern Magoffin County and not far from the Breathitt County line, Long & Compton et al are drilling at 1,700 ft. on 1 Charley Rowe, One quarter of a mile east of this well, Endicott & Compton et al are running 7-in. casing at 1,138 ft. on 1 Walter Salyers. These two wells are the only currently active rigs in operation in the field, which now has five producers with two dry holes also drilled. Pay is in the Big Six sand of Silurian age.

In northeastern Magoffin County and in the old Mine Fork oil pool, Bed Rock Petroleum Corp. recently completed 3, Jack Hunley for 10 bbl. per day from the Weir sandstone at a total depth of 1,023 ft.

WESTERN KENTUCKY

OWENSBORO.—In Daviess County, Great Lakes Carbon Co. has completed 2 Ann Pettit, SW NW NW 25-P-33, on the northeast edge of Pellville pool, with an initial production of 195 bbl. per day. Production is from the McClosky, topped at 986 ft.

Gulf Oil Corp. has completed 1 A. Y. Keach, 1-O-25 Henderson County, for 47 bbl. per day from the Hardinsburg at 1,707-17 ft. The well is an addition to North Euterpe pool that was opened last November.

In the area northeast of Livermore in

LEGAL

U. S. DEPARTMENT OF THE INTERIOR, Bureau of Land Management, Washington 25, D. C. Notice is hereby given that the lands listed herein are offered through sealed bids on the terms hereinafter specified, to qualified bidders of the highest cash amounts per acre as a bonus for the privilege of leasing the lands under sec. 17 of the Leasing Act of February 25, 1920 (41 Stat. 437; 30 U.S.C. sec. 181), as amended. All bids must be submitted to the Director, Bureau of Land Management, Washington 25, D. C., on or before 1 p.m. of the date set out herein. Each bidder must submit with the bid one-fifth of the amount bid in cash or by certified check on a solvent bank or by money order made payable to the order of the Treasurer of the United States, and file the showing of qualifications to receive a lease required under 43 CFR 192.42 (b) and (c). The envelopes should be plainly marked that they are not to be opened before the date and hour set out herein, and should show the number of the parcel and the name of the field. No bids received after the hour fixed herein for receiving bids will be considered. The remainder of the bonus and the annual rental must be paid and an acceptable surety bond in the sum of at least double the amount of rental, but in no case less than $1,000 nor more than $5,000, must be furnished by the successful bidder prior to the issuance of a lease. An acceptable $5,000 surety bond will be required prior to commencing drilling operations on the land. The deposits of the other bidders will be returned upon acceptance of the successful bids. Bidders are warned against violation of section 59, U. S. Criminal Code, approved March 4, 1909, prohibiting unlawful combination or intimidation of bidders. The right is reserved to reject any and all bids. Royalties payable to the United States will be at the rate of 12½ per cent to 25 per cent for oil, and 12½ per cent to 16⅔ per cent for gas, in accordance with Schedule B in the lease form. Annual rental will be at the rate of $1 per acre. The land is offered in one parcel described as SE¼SE¼ sec. 17, andE½NE¼ sec. 20, T. 33 N., R. 76 W., 6th P.M., Wyoming, 120 acres, and is within the known geologic structure of the Big Muddy Field, Wyoming. Bids must be submitted on or before 1 P.M. March 2, 1949. Marion Clawson, Director.

GEOLOGISTS

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PERSONNEL DIVISION

DEEP ROCK OIL CORPORATION

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McLean County, Hedges & Hedges have completed 1 J. W. Taylor, SE NE SW 21-M-29, for 45 bbl. per day on pump. Production is from the Cypress at 1,100-08 ft. Total depth is 1,204 ft.

In the Guffie pool of McLean County, Miller & Shiarella and Ashland Oil & Refining Co. have completed 6 Sandfur, 20-N-27, in the Jackson sand for 98 bbl. per day on pump. The pay was shot with 160 qt.

Last November, J. C. Miller and Ashland Oil & Refining Co. opened Wyman pool with the completion of 1 Bennett, 6-N-27, McLean County. This was a good Cypress well. Last week, J. C. Miller completed 1 Oldham, 6-N-27, for 25 bbl. per day from pay at 1,986-2,003 ft. reported to be Jackson sand.

INDIANA

EVANSVILLE.—Superior Oil Co. has completed 1 Joseph Kolb, NW SE SW 22-1s-10w, Gibson County, about 4 miles northeast of Princeton. The well was completed in the McClosky for 57 bbl. per day through perforations at 1,874-78 ft. and 1,898-1,902 ft. The pay was treated with 2,000 gal. of acid. The same operator is coring at 1,895 ft. at 1 Samuel J. Kolb, ¼ mile to the east.

F. B. Cline has completed 1 Donham et al, NE NW SW 24-11n-8w, Vigo County, for 10 bbl. per day from the Devonian, topped at 1,624 ft. The well is on the east side of the abandoned Riley pool.

Coy Oil Co. found a slight show of oil but not commercial production at 1 C. Shirley et al, SE SE NW 21-2n-7w, Daviess County.

In the northwestern part of Posey County, Aurora Gasoline Co. and First National Petroleum Co. 1 Charles Rickens, NW NE NE 20-4s-13w, is drilling below 2,585 ft. after calling top of the Palestine at 1,970 ft. and the Glen Dean lime at 2,363 ft. The wildcat is about 3 miles northeast of New Harmony.

INDIANA WILDCAT FAILURE

Posey County: C. E. Skiles 1 L. O. Coudret, NW NW SE 3-5s-12w, dry, TD 2,764 ft.

LA.-ARK.

Lincoln Test Awaiting Gage After Gas Flow

SHREVEPORT.—Southwest Gas Producing Co. 1 W. I. Burgess, Lincoln Parish distillate discovery in 8-20n-4w, was waiting on gage after making a flow of 5,200,000 cu. ft. of gas a day, plus an unestimated amount of distillate from the Vaughn section of the Cotton Valley at 8,684-8,702 ft. The flow was through $\frac{7}{16}$-in. tubing choke, under pressure of 1,700 psi. shut-in tubing pressure was 2,700 psi.

Sohio Petroleum Co. 1 G. E. Raworth, Tensas Parish Paluxy test in 26-12n-10e, slightly porous sand with distillate odor. Recovery from 8,403-08 ft. was 3 ft. of nonporous sand with faint gas odor, and approximately the same to 8,413 ft. A drill-stem test was run from 8,388-8,413 ft., using 500 ft. of water blanket. Recovery was 350 ft. of distillate-cut mud, 180 ft. of salty distillate-cut mud and 300 ft. of salt water. Operators were coring ahead below 8,453 ft. in the lower Cretaceous.

Continental Oil Co. 1 Mansfield, 34-13n-4w, Winn Parish, ran electrical surveys to 7,613 ft. and prepared to core at 7,778 ft. Base of the Massive anhydrite was placed at 7,546 ft., on elevation of 173 ft.

In Bossier Parish, Barnsdall Oil Co. 1 Ardis & Co., 27-22n-11w, was drilling in the Pettit below 6,325 ft. Cores from 6,100-6,149 ft. recovered shaly lime with no shows. M. T. Halbouty 1 Hall-Zeigler, 7-22n-23w, spudded and was drilling below 2,380 ft. in chalk. Proposed depth is 4,000 ft.

S. M. Aronson 1 Sentell, 23-19n-14w, southeast of Dixie field in Caddo Parish, was drilling below 1,140 ft. It is a new Cotton Valley test. The Chicago Corp. 1 A. M. Allen, 15-22n-15w, was dry in the Glen Rose at 3,475 ft. It cored sand and shale, bleeding oil, at 3,377-86 ft., then shows in the same material at 3,386-3,415 ft. A drill-stem test from 3,380-3,415 ft., open 1 hour, produced a slight blow and recovered 180 ft. of mud with a slight show of oil and gas, plus 1,710 ft. of salt water. Phillips Petroleum Co. 1 Ellerbe, 17-15n-12w, was coring below 8,473 ft. in the Cotton Valley. It recovered sand, shale and lime with no shows from 8,222-8,473 ft.

NORTH LOUISIANA WILDCAT FAILURE

Caddo Parish: Chicago Corp. 1 A. M. Allen, NW SE 15-22n-15w, dry, TD 3,475 ft., Nacatoch 1,100 ft., basal Annona 1,873 ft., Tokio 2,080 ft., Blossom 2,108 ft., lower Cretaceous 2,465 ft., anhydrite stringer 3,467 ft., elev. 206 ft.

ARKANSAS WILDCAT FAILURE

Ouachita County: Carter Oil Co. 1 J. S. Powell, SE SE 31-11s-19w, dry, TD 2,681 ft.

Phillips Plans Bulk Plant at Houston

HOUSTON.—An outbound bulk-handling plant will be built by Phillips Petroleum Co. in this city at the site of its new $6,000,000 ammonium sulphate plant.

The plant is scheduled to be in operation by April 1 and will cost over $1,000,000. It will be designed to handle approximately 200 tons per hour. The new plant is being built primarily to handle the output of Phillips' fertilizer plant, but will also be available for other Houston port users.

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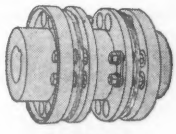
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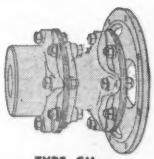
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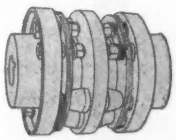
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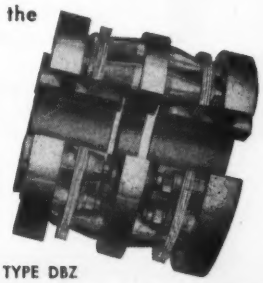
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Wherry Places Poor Evaluation on Stocks

(Continued from page 72)

in the postwar boom was doing a wonderful job. If there was any major industry, or any recognized group of economists or business analysts who did not underestimate the demand in that frenzied postwar boom, most people have not heard of them.

Then too, every oil man will be amazed to learn that his industry does not contemplate drawing on stocks. A chart of crude-oil stocks from 1940 to date certainly shows a consistent jagged pattern of ups and downs. Of course you can't draw on stocks once you have reached the minimum level of inventory you have to have on hand to keep operating.

The oil-producing states, and particularly Texas, are accused of deliberately holding production of crude oil below the market demand. Yet in another part of the subcommittee's report, this statement is made:

"Actually during the worst of the spot shortages in the East, crude oil and products were backing up at the Gulf."

In this part of the report, the subcommittee was criticizing the U. S. Maritime Commission, a federal government agency, charging it with responsibility for a shortage of tankers. It seems hardly consistent to charge the State of Texas with deliberately holding production of oil below the market demand, and yet admit that oil was backing up in storage on the Texas Gulf Coast because of a shortage of tankers to move it to the East Coast. It seems contradictory to base the whole structure of charges on the foundation that there was oil in storage which was not delivered to independent refiners; yet at the same time saying stocks were backing up because of lack of tanker transportation.

But then neither was the subcommittee chairman consistent in another part of the report. In a letter to the Secretary of Commerce, protesting export licenses for pipe to Saudi Arabia, he states:

"I know further that there is a very serious danger and real fear in the Midwest that homes will be cold and businesses forced to operate at reduced levels because of a lack of oil and natural gas resulting from a lack of steel pipe with which to transport this oil and gas from the wells and refineries to the consuming areas."

When the oil shortage was first foreseen, during the shortage, and after it was over, the public, the U. S. Senate, and anyone who asked, got a consistent answer from the industry. There was enough crude oil to meet all demands; there was enough refining capacity to manufacture all the products needed; but due to lack of steel, there wasn't quite enough transportation capacity to handle the peak load of the unexpected boom demand of the postwar period. They were told that the industry was working desperately to build additional transportation facilities, but that it took time and especially steel.

Shortages in petroleum products were not the only shortages in consumer goods during the immediate postwar period. Every housewife knows about the shortages. She also remembers how many, many, times the explanation was given that it takes time to fill the "pipe lines" between the producer and the consumer. She knows what it means to her today to go into a store where the merchant has a normal stock of goods from which to make her selection. She knows what it meant when the merchant didn't have a normal working stock. There were thousands of electric refrigerators, washing machines, and other hard-to-get items in "stocks" at a time when she couldn't go into a particular retail store and buy one. People understood that.

But the Senate subcommittee couldn't understand that the same thing held true of the petroleum in-

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dustry. So—out of a failure to understand such a simple thing, the committee built up a whole structure of false charges. Perhaps the committee ought to have had at least one housewife on its investigating staff.

Foreign Output Should Greatly Concern U. S.

(Continued from page 71)

foster industrialization of Central Canada and will better the dollar-exchange position that Canada now holds with the United States. Canada now seems to be on the road to self-sufficiency in oil, although complete supply of her own market is still unrealized and indefinite.

A third paper, "The Pacific Coast—Its Growth and Its Petroleum," by Austin Cadle, manager, economics and statistical department, Standard Oil Co. of California, emphasized that almost 70 per cent of the energy requirements of California, Oregon, Washington, Nevada, and Arizona is furnished by petroleum and 22 per cent by natural gas. A million barrels per day of raw materials must be produced, transported, refined, and distributed in these western states, and demand is expected to grow. Growth will be modified because dieselization will reduce demands for heavy fuels. California fields supply the major portion of the demand, but such areas as West Texas, New Mexico, and the Rocky Mountains will augment the local production.

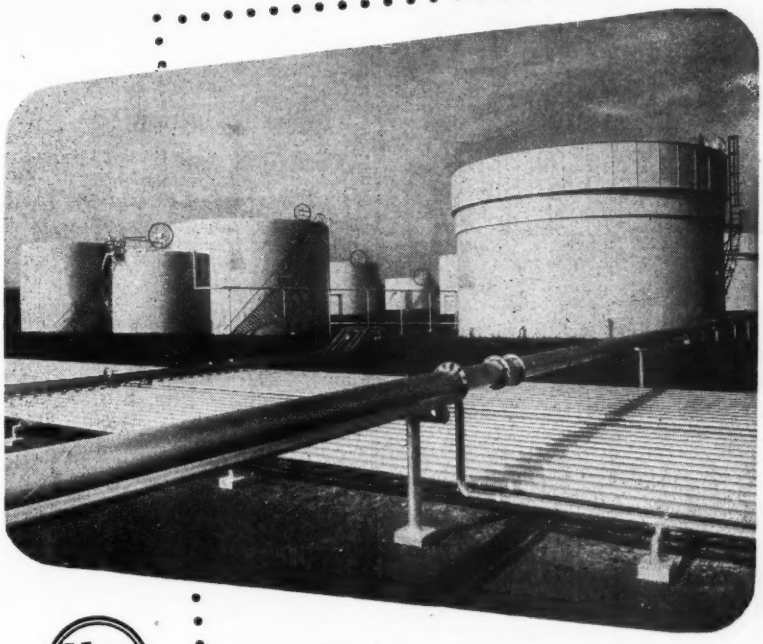
The technical papers given at the A.I.M.E. San Francisco meeting will be published in a special "Digest presentation" in next week's issue of the Journal.

Carriers Group Launches Tank-Truck Safety Contest

WASHINGTON. — A national tank truck safety contest for petroleum carriers operating in intercity or over-the-road service was launched last week by National Tank Truck Carriers, Inc., at a conference of the American Trucking Associations, in cooperation with the A.T.A. and shippers of petroleum products.

The contest will usher in a long-range safety program which has been undertaken by the three groups. Participation in the contest was urged in letters sent out to the traffic managers of the country's oil companies, in which it was explained it is merely the first step in developing "some accurate tank-truck safety information which we hope to be able to use in furthering a more effective safety program."

Conference awards will be made to carriers operating up to 500,000 miles annually, from 5 hundred thou-



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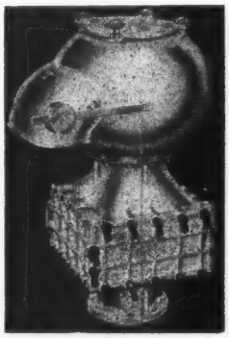

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Tanker Program for National Defense Is Submitted

The American tanker industry, largely oil-country operated, has submitted a memorandum to the United States Maritime Commission setting forth what it considers the requisites of a successful government-industry program for the construction of high-speed national-defense tankers.

The tanker program is intended to provide a reserve of high-speed tankers which would be available to the government in case of an emergency. The suggestions made, according to reports in New York, meet some of the objections of leading tanker operators to government policy.

Among the proposals were suggestions that the commission give tanker owners full information on the defense vessels regarding construction contracts, bids, and other details; that administration regulations restricting "lawful use" of tankers be cancelled; that "trade-ins" of war-built tankers be accepted; that the Internal Revenue Bureau establish accelerated rates of depreciations; and that terms of the commission's contract regarding value of vessels requisitioned be liberalized.

West Kansas Chapter of A. P. I. Being Revived

The Western Kansas chapter, American Petroleum Institute, is being revived, to embrace Barton, Ellis, Pratt, Rice, Russell, and Stafford counties. The chapter has been inactive since 1944.

Lloyd Pickrell, vice chairman (Kansas) of the Mid-Continent section of A.P.I., presided at the organization meeting. Officers include: chairman, W. D. Maxwell, Great Bend district superintendent, Carter Oil Co.; and vice chairman, Clayton Nygaard, assistant district superintendent, Sohio Petroleum Co., Russell, Kans.

V. S. (Mike) Mercier, district sales engineer, Lane-Wells Co., Wichita, spoke on radioactivity well logging during the organizational meeting.

Imperial's Leduc Plant To Be Started by Spring

Construction of a 24,000,000 cu. ft. daily gasoline plant in Leduc field is due to be started this spring by Imperial Oil, Ltd. The project, estimated to cost $6,500,000, includes a gathering system and compressor station.

Plant recovery will include propane as well as butane and natural gasoline. Completion is due in midsummer 1950. C. F. Braun & Co. has the design and engineering contract. Residue gas not sold or used in the field will be injected in the reservoir.

Navajo Lease Bids Asked

Circulars soliciting bids for oil and gas leases at a sale to be held at Window Rock, Ariz., March 4 on 16,491.34 acres of Navajo allotted land, and 1,000 acres of executive order

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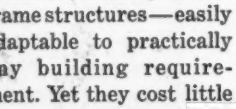

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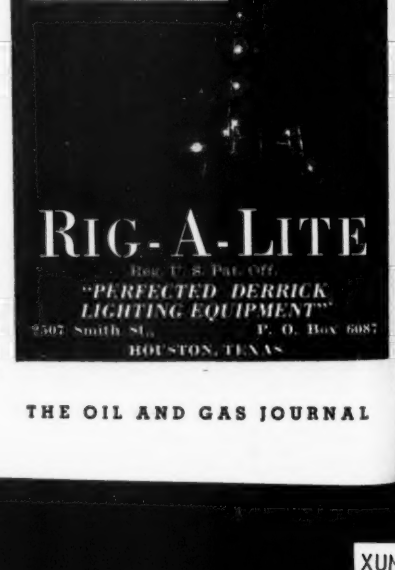


lands, have been issued by the general superintendent of the Navajo agency. All lands are located off the reservation in San Juan County, New Mexico, in what is known locally as the Kimbeto area.

Wherry Urges Study Of Basic Materials

(Continued from page 72)

back her takings of United States oil to 50 per cent of the January 1497 level.

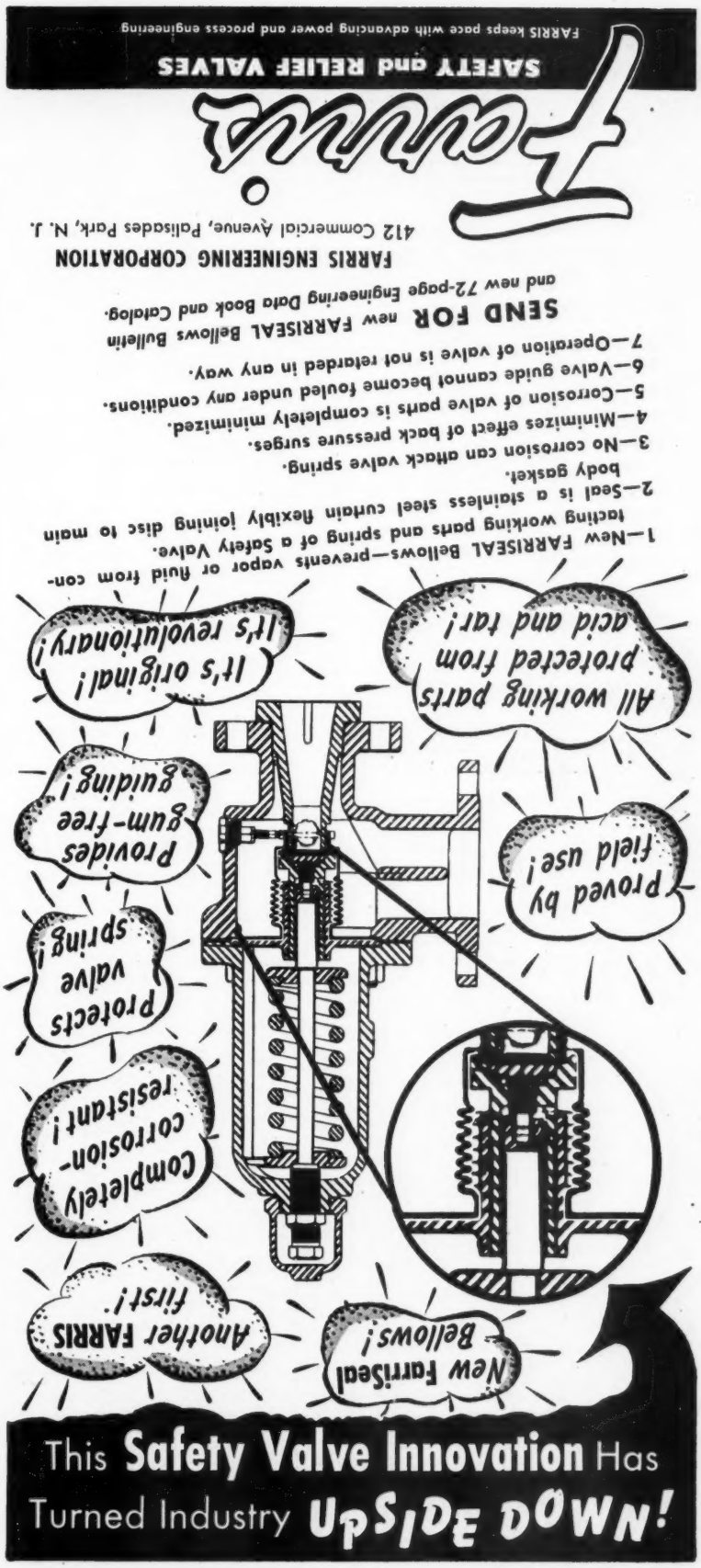
The report was highly critical of the Trans-Arabian pipe line, declaring "it is obvious from its location on the map that the Saudi Arabian pipe line is not a defensible project from the standpoint of national defense," but admitting that the oil which is coming from Aramco's fields and other producing properties in the Middle East "is invaluable to relieve the needs of Western European countries that could not be served otherwise without strain upon Western Hemisphere resources."

Wherry charged that the Secretary of Commerce dodged inquiries as to the amount of steel that was being granted export licenses for the pipe line, differentiating between steel provided for that project and that permitted export for Saudi Arabian field development.

"In the opinion of the committee," he asserted, "the splitting of hairs as to what phase of the Saudi Arabian oil project is receiving large quantities of steel is not important. What is important is that thousands of tons of steel pipe and other steel are going into a pipe line across the Saudi Arabian desert that might better have been spent in developing oil projects nearer home. The steel subcommittee has been able to do nothing more than secure a partial curtailment. And there is no assurance that further exports for the actual pipe line will not be resumed at any time the Secretary of Commerce deems it advisable."

Wherry pointed out that shipments of steel to other Middle East projects also have increased appreciably, and charged that 11,650 tons of pipe licensed to Anglo-Iranian Oil Co. to carry oil to port side from Agha Jari fields with an understanding that it would make available to this country 40,000 bbl. of the field's 100,000 bbl. daily production, will not result in any such amount of oil being made available to the United States.

"These and other shipments of steel abroad need to be accurately reported as to their use, and gaged as to the strain they are putting upon supplies available for the domestic economy and for developing oil resources nearer home—and their relative importance for carrying out our foreign policies," Wherry commented.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FARRIS keeps pace with advancing power and process engineering
FARRIS ENGINEERING CORPORATION
412 Commercial Avenue, Palisades Park, N. J.
SEND FOR new FARRISEAL Bellows Bulletin and new 72-page Engineering Data Book and Catalog.
7—Operation of valve is not retarded in any way.
6—Valve guide cannot become fouled under any conditions.
5—Corrosion of valve parts is completely minimized.
4—Minimizes effect of back pressure surges.
3—No corrosion can attack valve spring.
body gasket.
2—Seal is a stainless steel curtain flexibly joining disc to main
tacting working parts and spring of a Safety Valve.
1—New FARRISEAL Bellows—prevents vapor or fluid from con-
All working parts protected from acid and tar!
It's original! It's revolutionary!
Provides gum-free guiding!
Proves by field use!
Protects valve spring!
Completely corrosion-resistant!
Another FARRIS first!
New FarriSeal Bellows!
This Safety Valve Innovation Has Turned Industry UPSIDE DOWN!

STATISTICS and

WEEKLY WELL COMPLETIONS . . WEEK ENDED FEBRUARY 12, 1949

	Total of all wells					Cum.		Wildcat completions and discoveries					Cumulative total, 1949				
	Comp.	Oil	Gas	Dry	Footage	1949	1948	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	24	12	0	*12	22,941	127	225	0	0	0	0	0	0	0	0	0	0
Pennsylvania	32	15	2	†15	52,153	220	417	0	0	0	0	0	0	0	0	1	1
West Virginia	13	3	9	1	33,956	67	103	0	0	0	0	0	0	0	1	2	3
Ohio	19	5	2	12	49,109	138	139	0	0	0	1	1	0	0	0	5	5
Indiana	8	2	0	6	12,383	116	120	0	0	0	1	1	1	0	0	21	22
Kentucky	24	9	7	8	42,098	89	84	0	0	0	0	0	1	0	0	5	6
Illinois	36	22	0	14	95,462	238	272	0	0	0	6	6	3	0	0	42	45
Michigan	15	7	0	8	41,899	109	101	1	0	0	6	7	3	0	1	42	46
Kansas	50	34	4	12	162,785	333	374	2	0	0	1	3	8	0	1	44	53
Neb., Mo., Iowa	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oklahoma	36	18	2	16	149,136	396	497	1	0	0	3	4	23	3	1	60	87
Texas	201	114	24	63	932,683	1,444	1,339	8	1	1	23	33	49	2	12	237	300
North Central (Dist. 7-B & 9)	59	28	1	30	195,150	440	397	4	0	0	9	13	25	0	1	98	124
West (Dist. 7-C & 8)	31	23	1	7	158,286	312	353	0	0	0	2	2	6	0	0	19	25
Panhandle (Dist. 10)	38	20	16	2	141,154	156	78	0	0	0	0	0	0	0	0	0	0
Eastern (Dist. 5 & 6)	14	12	1	1	69,644	79	76	0	0	0	1	1	0	0	1	13	14
Gulf Coast (Dist. 2 & 3)	35	18	2	15	231,986	227	225	1	0	0	5	6	9	1	8	51	69
Southwest (Dist. 1 & 4)	24	13	3	8	136,463	230	210	3	1	1	6	11	9	1	2	56	68
Louisiana	38	28	4	6	244,961	263	232	0	0	0	3	3	2	0	0	19	21
Northern	12	9	2	1	37,401	145	147	0	0	0	1	1	0	0	0	10	10
Southern	26	19	2	5	207,560	118	85	0	0	0	2	2	2	0	0	9	11
Arkansas	5	4	0	1	33,182	20	50	0	0	0	1	1	1	0	0	8	9
Mississippi	6	4	0	2	34,953	39	51	0	0	0	0	0	1	0	1	9	11
Southeastern States	0	0	0	0	0	5	6	0	0	0	0	0	0	0	0	4	4
Montana	1	0	0	1	9,018	21	34	0	0	0	1	1	1	0	1	3	5
Wyoming	11	6	0	5	51,272	68	53	0	0	0	5	5	2	0	0	15	17
Colorado-Utah	1	1	0	0	6,477	21	38	0	0	0	0	0	1	0	0	5	6
New Mexico	15	12	1	2	85,507	64	80	0	0	0	2	2	1	0	0	6	7
California	49	42	0	7	197,183	315	341	1	0	0	7	8	6	0	0	52	58
Total United States	584	338	55	191	2,257,158	4,093	4,556	13	1	1	60	75	103	5	18	580	706
Total previous week	602	325	59	218	2,156,117	3,509	3,964	17	0	5	84	106	90	4	17	520	631
Total February 14, 1948	592	345	52	195	2,055,869			10	1	6	79	96	90	6	30	605	731

Service wells included: *12, †15.

CRUDE PRICES AND REFINERY ACTIVITY

GRAVITY SCHEDULES

Gravity—	Signal Hill, Calif.	Okla-homa, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$2.17	....	....	....
19-19.9	2.19	....	....	....
20-20.9	2.21	$2.25	....	$2.12
21-21.9	2.23	2.27	....	2.14
22-22.9	2.27	2.29	....	2.16
23-23.9	2.30	2.31	....	2.18
24-24.9	2.34	2.33	$2.56	2.20
25-25.9	2.38	2.35	2.58	2.22
26-26.9	2.41	2.37	2.60	2.24
27-27.9	2.45	2.39	2.62	2.26
28-28.9	2.49	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.56	2.45	2.68	2.32
31-31.9	2.59	2.47	2.70	2.34
32-32.9	2.62	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.38
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point. †Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947. (For detailed price changes in all fields see The Oil and Gas Journal, January 1, 1948, page 107.)

A.P.I. REFINERY REPORT, WEEK ENDED FEBRUARY 5

(Thousands of barrels)

District—	Crude runs, daily avg.	Production: Gasoline†	Kerosine	Gas & dist. oil	Residual	Stocks at refineries, bulk terminals, in transit and in pipe lines: Gasoline*	Kerosine	Gas & dist. oil	Residual
East Coast	805	2,029	268	1,068	1,270	24,873	9,429	21,592	12,041
Appalachian:									
District 1	102	313	56	81	107	2,789	407	811	453
District 2	70	258	27	51	127	1,526	124	223	222
Ind., Ill., Ky.	973	3,187	479	1,071	1,226	26,553	3,673	9,205	5,077
Okla., Kans., Mo.	413	1,589	107	615	521	11,862	880	3,748	2,506
Inland Texas	249	1,055	67	204	413	4,748	491	726	1,224
Texas Gulf Coast	1,281	3,849	671	1,947	1,660	18,934	2,892	11,067	10,160
La. Gulf Coast	442	1,183	429	571	457	6,332	1,977	2,961	3,316
N. La. and Ark.	64	187	56	53	103	2,518	521	968	259
Rocky Mountain:									
New Mexico	12	45	3	17	26	107	35	42	38
Other Rocky Mtn.	135	426	30	155	246	3,217	140	1,171	916
California	843	2,343	81	1,170	2,065	13,710	670	11,661	46,171
Feb. 5, 1949	5,389	16,464	2,274	7,003	8,221	117,169	21,239	64,175	82,383
Jan. 29, 1949	5,490	17,531	2,588	7,547	8,178	114,970	21,873	67,432	84,462
Feb. 7, 1948	5,348	15,476	2,468	7,870	9,154	105,100	11,119	38,538	50,257

*Finished and unfinished. †At refineries including natural blended.

Bureau of Mines crude-oil stocks 254,472,000 bbl. as of February 5—down 987,000 bbl. One year ago 226,482,000 bbl.

FLAT CRUDE PRICES

Representative posted schedules per bbl.	
East Texas†	$2.65
Kettleman Hills, California*	2.14
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.38
Bradford, Pennsylvania	4.00
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

XUM

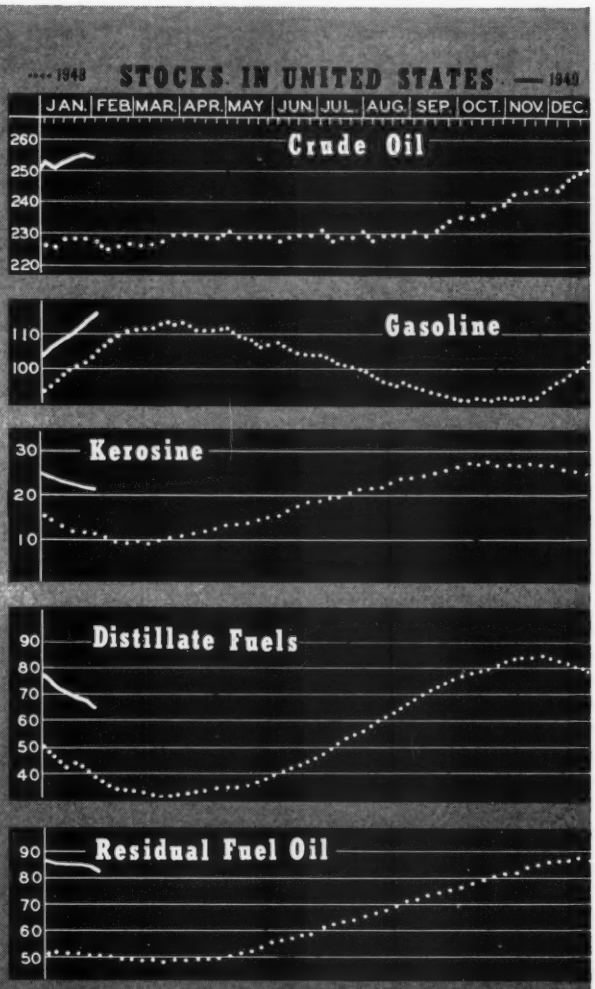
TRENDS

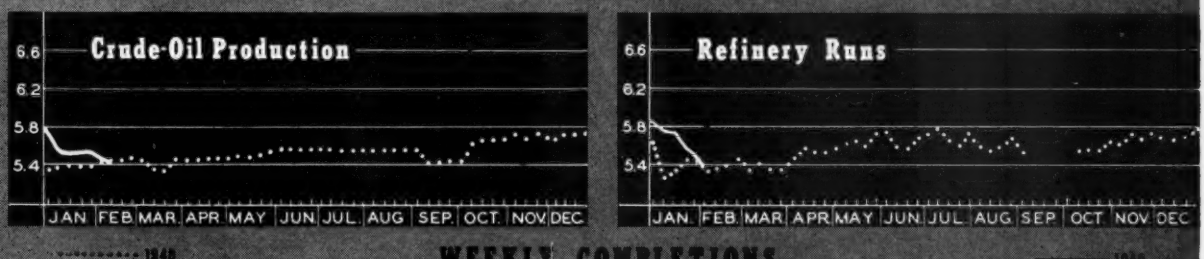
DAILY AVERAGE PRODUCTION FOR WEEK

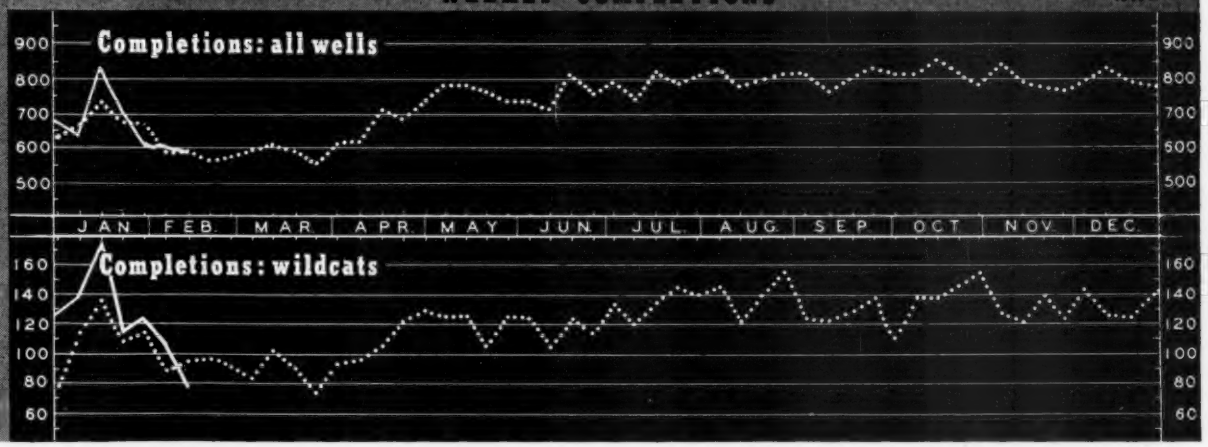
	Feb. 12 crude oil	B. of M. Feb. demand	Feb. 5 crude oil
Alabama	1,300	1,700	1,200
Arkansas	82,900	84,000	82,600
California	944,600	950,000	946,100
Colorado	*62,150	52,000	62,100
Eastern	60,000	62,300	63,000
Florida	1,200	1,300	1,200
Illinois	172,800	167,000	177,300
Indiana	20,800	21,000	23,200
Kansas	275,350	296,000	245,550
Kentucky	25,100	22,000	23,200
Louisiana	505,850	480,000	506,150
North Louisiana	119,550	.....	120,200
South Louisiana	386,300	.....	385,950
Michigan	47,900	45,000	46,500
Mississippi	109,350	126,000	109,450
Montana	23,500	24,000	24,050
Nebraska	300	700	300
New Mexico	134,850	127,000	135,075
Oklahoma	412,750	420,000	450,600
Texas	2,320,950	2,420,000	2,324,550
Dist. 1 (Southwest)	27,990	.....	27,675
Dist. 2 (Southwest)	155,900	.....	157,650
Dist. 4 (Southwest)	220,025	.....	221,600
Dist. 3 (Gulf Coast)	442,360	.....	445,325
Dist. 5 (Eastern)	44,700	.....	45,125
Dist. 6 (Eastern)	107,425	.....	109,725
East Texas Field	317,200	.....	309,150
Dist. 7-C (West)	49,950	.....	49,500
Dist. 8 (West)	660,150	.....	664,925
Dist. 7-B (W. Central)	65,925	.....	64,975
Dist. 9 (N. Central)	139,425	.....	139,200
Dist. 10 (Panhandle)	89,900	.....	89,700
Wyoming	135,000	140,000	141,000
Total United States	†5,336,650	5,440,000	5,363,125
Change from prev. wk., dn.	26,475		

Total production January 1-February 12 ... ‡236,330,350 bbl.
Same period last year (crude plus cond.) ... 232,160,355 bbl.

*Incl. 150 bbl. Utah production. †Not incl. 85,150 bbl. condensate. ‡Incl. 3,556,045 bbl. condensate.







XUM

PENBERTHY
AUTOMATIC
INJECTORS

The accepted method for assuring an uninterrupted supply of feed water to oil field boilers. Penberthy Automatic Injectors will supply feed water to boilers at minimum cost, are quickly and easily installed, reliable under most severe operating conditions, require little attention and no careful handling. Highest quality design and rugged construction.

PENBERTHY INJECTOR CO.
DETROIT, MICH. Canadian Plant WINDSOR, ONTARIO

RAIL

IMMEDIATE DELIVERY

100 tons NEW 40# ASCE
500 tons 16, 25 & 35#
Large tonnages in stock of 56# to 110# Relay.

TIE PLATES

Substantial inventory, 60 to 110#.

COMMERCIAL METALS CO.

1712-E Arcade Bldg., St. Louis 1, Mo.

CEntral 4457 & LD-99

MARKETS

THE downward trend in products prices over the United States continued without letup the past week.

Following the announcement of Standard Oil Co. of Ohio of a ¾-cent cut in tank-car gasoline prices, another half cent was shaved off the price of 26-70 grade natural gasoline, bringing that product down to 7 cents Group 3 and 6½ cents North Texas. The new prices were effective February 9. The change brought the 18-55 price to 8.4 Group 3 and 7.8 Breckenridge. It was the second drop in natural-gasoline prices since the 1-cent reduction announced January 31.

Heavy fuel oil continued to be the "problem" product over the nation with No. 6 reported still moving at prices well below those announced by refiners. The recent sharp cuts in fuel-oil prices brought from R. M. Bartlett, vice president of Gulf Oil Corp., the warning that heavy fuel again is battling with coal for the same market. "The industry's program of modernization and improvement has succeeded so well that we are again able to compete with coal. . . . The battle of the two giant energy sources, oil and coal, is on again in full force," Bartlett said in an address in Hartford, Conn.

Harbor Prices Down

Heating-oil prices in New York harbor dropped last week when Socony-Vacuum Oil Co., Inc., made reductions amounting to 0.2 cent for No. 2 oil at the barge level.

A reduction in the light oil price has been anticipated since this market has been weakening under the impact of overfull storage and under-normal consumption due to warm weather in the East.

Socony-Vacuum's new barge price is 8.8 cents for No. 2, but spot-market suppliers lowered their prices correspondingly and the product was reported available in the harbor at 8.5 cents. Esso Standard Oil Co., leading marketer on the New Jersey side of the harbor, took no immediate action.

At the retail level, Socony-Vacuum reduced both kerosine and No. 2 by amounts greater than the barge cut. No. 2 was cut 0.5 cent to 12 cents tank wagon, and kerosine, 0.4 to 13.9 cents tank wagon.

Gulf Coast Quiet

Along the Gulf Coast there were continued signs of weakening in the over-all products market. Trading continued quiet, and both Bunker C and No. 2 fuel were reported moving at prices considerably below refiners' lows. Unlike the week before, there were no sharp breaks in products prices.

Crude Drop Rumored

Falling products prices continued to focus attention on rumors of an impending drop in the posted prices for crude oil, with some observers predicting sharp cuts of 25 to 60 cents per barrel in the near future.

Stocks of gasoline were reported continuing the rise noted a week ago, in spite of reduced runs to stills. Gasoline stocks on February 5 totaled 117,169,000 bbl., a new peak and a gain of 2,492,000 bbl. over the preceding week, according to a report of the American Petroleum Institute. Crude runs dropped from 5,490,000 bbl. daily during the week ended January 29 to 5,389,000 bbl. daily during the week ended February 5.

Representative Quotations

Representative spot-market quotations of leading suppliers as of February 14, 1949. Figures are f.o.b. plant for tank-car shipment in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor	Texas Gulf Coast
Regular gasoline, 73-75 octane	9¾-10	12.0-12.4* 11.0-12†	10.3-12.5
Premium gasoline, 78-80 octane	10½-10¾	12.0-13.4	11.0-13.5
42-44 w.w. kerosine	9⅛-9⅜	10.3- ...	9.1-10.5
No. 2 straw fuel oil	8¼-8½	9.1- ...	9-9⅛
No. 6 residual	$1.35-1.45	$2.35-2.45	$2.05-2.08

*Branded (74-76 octane); †Unbranded (74-76 octane).

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	7	6½	6¾
Grade 18-55	8.4	7.8	8.0

LUBRICATING OILS
South Texas

200 vis., No. 2-3 neutral	12-13.5
750 vis., No. 3-4 neutral	15-16.5
2,000 No. 5-6 neutral	17-18.5

LUBRICATING OILS
Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	24
200 vis., No. 3 neutral, 0-10 pp.	15

Western Pennsylvania

144-155 vs. 10 p.t. bright stock	27.0-40.5
180 vis. p.t., neutral	27.5-38.5

CRUDE-SCALE WAX
Mid-Continent

132-134 A.M.P.	5

EQUIPMENT MEN ... in the News

S. E. Meserve Becomes Fluor Board Chairman

S. E. MESERVE

Shirley E. Meserve, president and general counsel for Fluor Corp., Ltd., has been elected chairman of the board. Succeeding Meserve as president of the company is Donald W. Darnell, who joined the company in 1925 as an engineer. J. S. Fluor, Jr., absent from the company since 1946, has returned and has been elected to the position of executive vice president.

D. W. DARNELL

J. S. FLUOR

Reorganization of the company into two major divisions brought about other shifts. W. Earl Dunn, formerly executive vice president, was named vice president and general manager of the engineering and construction division, and J. R. Fluor, formerly vice president and assistant general manager, was appointed vice president and general manager.

Wire Rope Institute Names David Larkin as President

DAVID LARKIN

At the annual meeting of the Wire Rope Institute, held January 21, David Larkin, executive vice president, Broderick & Bascom Rope Co., was elected president of the organization for a 1-year term. He succeeds E. C. Low, of John A. Roebling's Sons Co., who became chairman of the board.

Larkin is a graduate of University of Edinburgh, Scotland. He is widely known in the wire-rope industry, with which he has been actively identified for 21 years. He is chairman of the advisory board, Washington University school of engineering, St. Louis, and a fellow of the American Society of Mechanical Engineers.

In addition to Larkin and Low, other new officers of the institute are: vice president, H. C. Parker, Bergen Wire Rope Co.; secretary, W. A. Huber, Americal Chain & Cable Co.; and treasurer, D. W. Vernon, A. Leschen & Sons Rope Co.

Cragin is Vice President Of Refinery Maintenance

Refinery Maintenance Co., Inc., Compton, Calif., and Houston, announces the appointment of Robert B. Cragin as a vice president. This move is in line with further expansion of the company as designers, engineers, and constructors for the petroleum-refining, natural-gasoline, and petrochemical industries.

Cragin brings to the company a wide experience in the petroleum refining process and engineering field. He served as vice president of Houdry Process Corp. from 1944 until his resignation last March.

Prior to this he served as assistant director of the refining division, Petroleum Administration for War in Washington. He is a graduate of Princeton University and was employed by M. W. Kellogg Co. as process and sales engineer from the time of his graduation until his government service.

McDonald, Robishaw Get A-1 Bit & Tool Promotions

C. B. McDONALD

E. J. ROBISHAW

A-1 Bit & Tool manufactures drill- to executive vice president and director of sales of A-1 Bit & Tool Co., Houston. E. J. Robishaw has been made sales manager. Until his present promotion Robishaw was in charge of research for the company.

A-1 Bit & Tool manufactures drilling and producing equipment including rotary-type side-wall core barrels, wire-line core barrels, core bits, replaceable-blade drilling bits, combination bits, mud mixers, combination casing mill and casing cutter, whipstocks, self-sharpening milling tools, drill collars, and rotary subs, water-cooled cat heads, and deviation instruments.

King Tool Establishes New Houston Office

King Tool Co., Longview, Tex., has recently opened a Houston office in the Southern Standard Building under the direction of Charles H. Lane. Another office is being opened at Corpus Christi by M. B. Llorente.

King Tool Co. manufactures various oil-field equipment including pneumatic pipe handlers.

Packing engineers of Sterling Packing & Gasket Co. in Houston for instructions on new synthetic packings were: A. L. Gaut, engineer, Corpus Christi; Paul R. Nordstrom, engineer, Tulsa; C. L. Fenity, Jr., district sales manager, Houston; Clarke Polk, assistant general manager, Houston; Fred J. Barnett, engineer, Odessa, Tex.; J. L. Dore, general manager, Houston; A. L. Brasseux, engineer, Abbeville, Tex.; and J. O. Meynier and A. G. Wilcox, engineers, both of Houston

Classified Advertising

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THE OIL AND GAS JOURNAL
P. O. Box 1260, TULSA, OKLAHOMA

EQUIPMENT FOR SALE

FOR SALE: Used Bethlehem S-40 Unit complete, powered with 145-GKU Waukesha Engine. Actually used 314 hours. C. L. McMahon, Inc., Tulsa, Oklahoma.

SAVE WITH SAFETY—Very Good Used Wire Line—Any Size or Length up to 5,000—Respooled for Your Inspection—Cable Tools For Sale. General Tool & Supply Co. P.O. Box 4387, Phone 61335, Oklahoma City, Okla.

FOR SALE: Approx. 600′ of 7″ 22# used Seamless Casing, 1500′ of 2½″ 10thd Seamless used Tubing. Tennant Drilling Co., 210-211 Rivoli Theatre Bldg., Blackwell, Okla.

FOR SALE

56 Miles 8″ and 28 miles 6″ line pipe. Now being lifted in eastern Pennsylvania Interested parties contact

PIPE LINE CONSTRUCTION & DRILLING CO.
Camp Hill, Penna. Phone 3-7884

USED STEEL PIPE AND TUBING

100,000 ft. of 1½″ O.D., 8 gauge
75,000 ft. of 2″ O.D., 10 gauge to 11 gauge
100,000 ft. of 2¼″ O.D., 10 to 11 gauge
50,000 ft. of 3¼″ O.D., 9 gauge
40,000 ft. of 4″ O.D., 10 to 11 gauge
50,000 ft. of 5½″ O.D., 8 gauge

All the above is seamless, plain end, hydrostatically tested for 850 lbs. pressure.

16,000 ft. of 3″ standard line pipe, 8 thread
25,000 ft. of 6″ I.D. welded steel pipe, approx. ⅛″ wall, plain end
6,000 ft. of 7″ O.D. lapweld casing, 8 thread, 20 lbs.
3,400 ft. of 14″ O.D. Naylor spiral welded steel pipe, 14 gauge, 40′ lengths, grooved for Victaulic couplings

Reasonable prices. Immediate shipment

Also, bolted, welded and riveted steel tanks for storage and pressure.
600 tons of steel plates from ¼″ to ⅝″ coming from grain tanks, like new, free of holes.

Please send for our late lists.

A. GREENSPON PIPE CO., INC.
3615 Olive Street St. Louis (8), Mo.
Phones Nos. Franklin 0064 and 1966

EQUIPMENT FOR SALE

FOR SALE: Wilson Mogul Drilling Rig. Lee C. Moore 87′ Jackknife Derrick. Compound GAK Waukesha Motors. 6x16 Wilson Snyder Pump. Capable of drilling 5000 ft. Complete rig in good condition. Terms if desired. Blalack Drilling Company, Box 1145, Gladewater, Texas. Phone 324. Price $35,000.00.

All sizes new and used Bucyrus-Erie Spudders. Prompt delivery. Zanesville Tool and Supply Company, Zanesville, Ohio.

BUCYRUS-ERIE 36L Spudder, Trailer Mounted, complete with 6, 8 and 10″ Spang Tools. Spudder and Tools in A-1 Condition Box 338, Albany, Kentucky.

SHOT hole drill on Ford truck, Hyd. lift mast, chain pull down, 3″ solid kelly, 4½″ x 6″ G. D. pump, twin disc clutches. $5000.00. Waters Drilling Service, 69 Beacon Place, Pasadena 8, Calif.

SEVERAL 10¾″ and 13⅜″ O.D. Used Wilson Side Door Elevators. Also few other sizes and makes. Advise your wants. Zanesville Tool and Supply Company, Zanesville, Ohio.

MURPHY DIESEL, ME-66

Brand New—Sacrifice—At OEM's Cost 1103 cu. in., 6-cylinder, 180 HP, @ 1200 RPM. Never been used. 20% off list. Contact: Box C-613, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

FOR CABLE TOOLS
DEGEN PIPE AND SUPPLY CO.
Box 107, Red Fork Station, Tulsa, Oklahoma

FOR SALE—Cardwell Draw Works, Model "L"—Air Clutches—A-1 Condition. Box 3246, Corpus Christi, Texas.

2—M.C. 350 Bethlehem rotary drilling rigs complete with 127′ Lee C. Moore Cantilever (Jack-knife) derricks, less drill pipe and drill collars. For further information write Sharp Drilling Company, P.O. Box 1271, Midland, Texas.

FOR SALE: Butane storage vessels. Two 34′2″ length x 10′ diameter x 1-5/32″ heads x 1⅛″ shell, code welded. $3,300.00 each. Box 610, Mt. Pleasant, Texas.

FOR SALE: One rotary drilling rig complete, capable of drilling to 4,000 feet with ease. Powered with two 6 Cyl. 185 H.P. G.M.C. Diesel motors. 7¼ x 12 Gardner-Denver pump that has only drilled 2—3,000′ wells. 86′ mast made out of 4½″ drill pipe. Raises same as L. C. Moore and only drilled one well. Complete with approximately 2,500 feet 4½-inch Range 2, F. H. drill pipe. Will sacrifice for $25,000.00. Allde Wells Company, 1449 South Broadway, Denver, Colo.

SEAMLESS CASING
Just Pulled—Like New

Approx. 3,780 ft. 8⅝″ OD, 36.7-lb., with 10½″ collars ..... **$3.50 ft.**

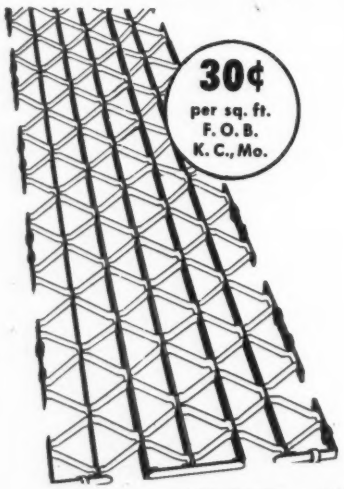
Approx. 1,400 ft. 10¾″ OD, 45.7-lb., with 12″ collars ..... **$5.00 ft.**

Located western Kansas

BROWN-STRAUSS CORP.
Kansas City 10, Missouri
P.O. Box 78 L.D. 169

ATTENTION DRILLERS — OPERATORS
BEAT THE MUDDY ROAD PROBLEM WITH THIS

PORTABLE STEEL GRATING



Ideal for temporary roads, impassable bogs, swampy marshes, etc. Two men can unload and assemble to form any desired width or length. Will support heaviest equipment. Easily portable, will last indefinitely. Quantities are limited, so order now!

SIZE: 12 ft. 6 in. long x 1 ft. 10 in. wide x 1 in. high.

WEIGHT: 135 lbs. per mat.

MATERIAL: Hardened steel.

WRITE — WIRE — PHONE

BROWN-STRAUSS CORP.

P. O. Box 78 L. D. 169 Kansas City, Mo.

EQUIPMENT FOR SALE

FOR SALE: Near Burrton, Kansas, 1—25′ x 84′ x 12 Bay, 13 Louver, Pritchard Atmospheric Cooling Tower, Type DW 36-12B with cooling tower coil shed. Distillation unit recently moved, rendering tower surplus. Cities Service Oil Co., Patridge, Bartlesville, Okla.

1—7¼ x 14 OILWELL Power Pump for rotary tools steam or power. Chapman Pipe & Supply, Oklahoma City, Okla.

WELL drilling spudders, beams, light rotaries, core drills, tools, casing. Used equipment at money saving prices. Spang and Mills new tools. Leschen lines. Everything for well drilling. Pressey & Son, Pueblo, Colo.

1—SUPERIOR — Type FB — 6 x 7 Vertical Gas Engine Complete with Standard Equipment. Located in Houston. Will guarantee as good as new. Box C-783, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: 1—Model QSVSI Cardwell Allsteel Single Drum Oil Well Servicing Skid Type Winch, Serial No. QS-119, powered by Ford V-8 Engine Serial No. BB18-4103910 located at Duncan, Oklahoma. Price $900. Cities Service Oil Co., Patridge, Bartlesville, Okla.

NEW USED

ALL SIZES

Immediate Shipment

CASING

PIPE

TUBING

Oil—Water Well—Gas

Columbus Steel Supply Co.

UN 1175 — L.D. 394

Columbus 3, Ohio

EQUIPMENT FOR SALE

CABLE TOOLS DRILLING RIG COMPLETE
66 WICHITA SPUDDER, 200 HP LeROI
Phone 423-J, Artesia, New Mexico, Box 125

FOR SALE: Near Burrton, Kansas, 1—18′ x 101′ x 35′ Fluor Atmospheric Cooling Tower Model 12-N with 4 wood water pans. Standing. Cities Service Oil, Patridge, Bartlesville, Okla.

BOILERS For Sale: One 90 H.P., 125# W.P. Broderick—$750.00; one 100 H.P., 200# W.P. Lucey—$1,250.00. Both locomotive type oil field boilers. State certificates furnished. Recently overhauled. In good running shape. Worth the money. The Clay Brothers Drilling Company, Inc., 1804 Fair Building, Fort Worth, Texas.

APPROXIMATELY 43,000′ New 2⅜" OD, Range 1, 4.7# Upset Tubing. Ft. Worth, Texas, ready for shipment. Subject to prior sale. Midwestern Constructors, Phone 3-4113, Tulsa, Oklahoma.

FOR SALE: Pipe Threading Machine. Bignal Keeler with Landis head. Cuts from 6" to 13". Direct motor drive. Several sets of dies. Machine now in operation. First-class condition. Price $3500.00. M. J. Regan, Coffeyville, Kans.

FOR SALE—CABLE TOOLS

Cable tools from 4" to 15", all small connections, valves of all kinds, blowout preventers, drilling gates. One all steel drilling machine or cleaning out machine with Waukesha WAK motor, OCS clutch and 60′ A Mast. Approximately 80 Tons of cable tools.

McComas Oilfield Supply, 606 S. Main, Phone 302, Box 173, Blackwell, Okla.

FOR SALE

12—230 H.P. Type 10 Bessemer New 17" Power Cylinders complete ready to run with 16" to 18" Compressors. 1—230 H.P. Clark Horizontal with Compressors. Located Salem, Illinois.

ENGLE PETROLEUM, Incorporated
Box 655, Evansville, Indiana

EQUIPMENT FOR SALE

FOR SALE: J-55—5½"—17# Casing, drive pipe from mill, 10,000 ton contract; in-users only. Box C-791, The Oil and Gas Journal, Tulsa, Okla.

PIPELINE Construction Equipment for Sale: Pipe cleaning machine with priming head, traveling or stationary, 6" to 12", excellent condition, $1,350. Two T40 International tractors with pipelayer attachments, good condition, very cheap. Contact C. W. Sternberg, 8250 Wier Drive, Houston, Texas. Phone Preston 7043.

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Hydraulic Casing Pulling Units. Complete line of equipment. Units made to your specifications. Truck Mountings or Skid Units. Repair Service and Parts.

OKLAHOMA MACHINE & SUPPLY CO.
Ada, Oklahoma

SHOT HOLE DRILLS
LARGE AND SMALL

All are truck mounted, rotary chain pull down, smallest pump size 3½ x 8. Some are in excellent condition, others need repairs. Price FOB Dallas from $3,000.00 to $8,000.00 including truck. For details write 8800 Lemmon Ave., Dallas 9, Texas.

FOR SALE

3713 feet 9⅝ O.D. 40.6# Seamless Oil Well Casing. Run in well but in excellent condition. Priced to sell.

1—125 H.P. 350# Working Pressure "Oil Well Boiler," completely reconditioned and in excellent condition. State inspected. $2250.00 our yard, Okla. City.

POWELL BRISCOE, INC.
1916 First National Bldg.
Oklahoma City, Okla.

NEW A.P.I. STEEL BOLTED TYPE TANKS

4— 250 bbl.	4— 1,500 bbl.
4— 500 bbl.	4— 2,000 bbl.
6— 750 bbl.	1— 5,000 bbl.
4—1,000 bbl.	6—10,000 bbl.

2—500 bbl. aluminum, 8 gauge

All for immediate shipment

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RECONDITIONED SEAMLESS TUBING

95,000 ft. 1½" O.D.
120,000 ft. 2" O.D.
55,000 ft. 2¼" O.D.
75,000 ft. 3¼" O.D.
80,000 ft. 4" O.D.
21,000 ft. 5½" O.D.

Single or Double Random Lengths—Plain Ends
Beveled for Welding
Approx. 10 ga. Wall

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Will Sacrifice!

PRESSURE VESSELS

1—9′-2⅞" x 39′-1" x 1 7/16", one 36" O.D. man way and one 16" O.D. man way.
2—4′-0" x 21′-2" x 1" with removable head bolted to shell. Can be bolted together to make one vessel approximately 37′ long.
1—7′-11" x 39′-5¾" x 31/32" vessel.
1—6′-0" x 23′-10" x ½" vessel.
2—4′-9" x 6′-0" scrubbers, U-69. Code welded. 60 P.S.I. at 650° F.
1—5′-0" x 9′-9" x 9/16" scrubber.
1—3′-1" x 15′-0" x ½" scrubber with one 16" man way.

ABSORPTION TOWER

1—5′-0" x 44′-7" x ⅜" welded construction, 13 trays with man hole at each tray. Pipe coil in bottom.

TANK CAR TANKS

1—7′-3" x 29′-0" x ½", 10,000 gal.
1—6′-6" x 25′-0" x ⅜", 6,000 gal.
1—5′-8" x 20′-1" x 5/16", 4,000 gal.

Above vessels have necessary pipe connections. All offered as is, where is, subject your inspection and acceptance. Located at our plant.

WRITE, WIRE OR PHONE

BROWN-STRAUSS CORP.

LD 169, P. O. Box 78, Kansas City 10, Missouri

EQUIPMENT FOR SALE

FOR SALE: Model "K" Cardwell, single drum draw works powered by G.A.K. Waukesha engine. Equipped with 98′ "A" mast and sub skid. Priced for quick sale. Terms. Melton Supply Co., Seminole, Okla.

FOR SALE: One 8 HP Pattin Bros. gear power. Will pump eight shallow wells. Used little over year. May be seen at Charles Melton Lease; Chatham, Ohio. Baldwin Drilling Co., Berea, Ohio.

FOR SALE: Wilson Giant draw works, powered by 2—J.L.-1335 Buda engines and Wilson chain compound. Like new condition, with bargain price. Terms. Melton Supply Co., Seminole, Okla.

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New and Used

Largest stock in America. 6x6, 6x4, 4x4, 4x2. All items guaranteed. Largest auto wrecking house in the west with most complete stock of new and reconditioned parts for all cars and trucks. New jeep power units complete with radiators and stub shafts. Fast service.

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All Sizes

Lapweld and Seamless
Used Oil Well Casing and Tubing
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Immediate Loading and Delivery
All Guaranteed No. 1 Pipe
With Certificate of Inspection
Carload Lots Only
The Market's Lowest Prices

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Box C-784,
The Oil and Gas Journal,
Tulsa, Oklahoma

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BUCYRUS-ERIE 24L Spudder, Trailer mounted; over 5,000 feet line; 2 strings of tools 4 inch to 10 inch; 2½ ton G.M.C. Tandem Dual Truck with detachable A-Frame and winch; 8-ft. x 10 ft. metal tool shed; Kohler Light Plant; 470 ft. new 10 inch wrought iron pipe; some used 6 and 8 inch pipe. All $10,000.00. Lealand West, The Scott County State Bank Building, Scottsburg, Indiana, Telephone 4931 or 4391.

WE wish to reduce our operations to one rig and offer for sale either of the following rigs. 1—U 15 Drawworks 2-NKU motors; 7¼ x 14" Oil Well PHD pump; 2—8′ x 6′ x 30′ factory built slush pits; Reagan BOP; Thompson LR Shaker; 127′ Lee C. Moore Mast; Steel Tool house; Steel Pipe racks; water tank; 4-drill collars, B. J. hook, Gumbo Buster 17½ table & etc. Rig complete ready for drilling, has drilled 23,000 ft. of hole. 6800 ft. 4½" drill pipe, Reed shrink grip joints (drilled 18,000 ft. of hole)—Price $100,000.00.

1—U10 Drawworks 2-RXIS LeRoi motors; C-150 pump, Lr Shaker, National hook, block & rotary table; 2—tool houses & etc.; 5700 ft. 4½" drill pipe. Rig complete ready for drilling. Price $40,000.00. B. & B. Drilling Co., Pauls Valley, Oklahoma.

USED L.W. CASING #1

5500′ 7" o.d. 26#
3500′ 8⅝" o.d. 32#
3100′ 10¾" o.d. 40#
1900′ 13" o.d. 50#
700′ 16" o.d. 70#
2100′ 5½" o.d. smls.

GLICKMAN IRON & SUPPLY CO.
439 S. St. Francis Phone 2-6418
Wichita, Kansas

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Two Cooper-Bessemer gas engine driven hot oil pumping units, complete. One 612 GPM, 550 p.s.i.g. pressure differential pump with 400 HP engine. One 324 GPM, 800 p.s.i.g. pressure differential with 240 HP engine. In excellent condition. Would consider selling either GNG-8 or ENG-8 engine separately. Inquire

E. B. McCormick, Chief Engineer

COSDEN PETROLEUM CORPORATION
Box 1311 Big Spring, Texas

EQUIPMENT FOR SALE

FOR SALE: 2—12" x 30" Connersville Vertical Type Blowers, 1400 CFM, 1# WP, 275 RPM, requiring 8.6 HP. Cities Service Oil Co., Patridge, Bartlesville, Okla.

PIPE: 4000′ 5½" OD, 14#, 8 rd. thrd., Range 3 seamless casing; 4000′ 5½" OD, 14#, 8 rd. thrd., Range 2 seamless casing; 4750′ 2" EUE, 4.7#, 8 rd. thrd., Range 2 seamless tubing; Two 210 bbl. welded tanks; One Bethlehem, 25-T B-5 pumping unit with FM ZC118. The above material purchased new less than 60 days ago and is now in same as new condition.

25,000′, 2" EUE, 4.7#, 8 rd. thrd., Range 2 Seamless tubing; 5000′, 5½" OD, 14#, 8 rd. thrd., Range 2 new seamless casing. All the above subject to prior sale. Geo. R. Brown, Jr., 911 Neil P. Anderson Bldg., Fort Worth, Texas. Phone 2-7088.

EQUIPMENT WANTED

WANTED: 3½" OD or 4½" OD used drill pipe, 3½" OD line pipe or tubing. SCHAFER PLOW, INC. Box 578, Pratt, Kansas. Atten.: J. L. Crowder.

EQUIPMENT WANTED

Am interested in purchasing good-second-hand, unit 15 rig, with either 2 or 3 motor compound. Please send description, price, and location to: Box C-732, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

WANTED: Supervisor for refinery pump and engine maintenance. Applicant must have engineering training and experience. Good salary with house furnished at low rent. Box C-746, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—Geologist with at least six years' well completion experience in Texas Gulf Coast Area. Box C-758, The Oil and Gas Journal, Tulsa, Oklahoma.

PETROLEUM Sales Executive: Large mid-west independent has immediate opening for experienced bright stocks and neutrals sales executive. Unusual opportunity. In replying give full information stating age, education, experience, salary required. Replies will be held confidential. Box C-790, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED by aggressive independent operator: Young Geologist with well experience in North Central Texas. Salary open. Box C-796, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED
CHIEF CHEMIST FOR CONTROL LABORATORY

TYPE PLANT: Absorption plants with reformer unit producing conventional petroleum products.
QUALIFICATIONS: Position requires person with knowledge of usual control analyses, knock engine operation, water treatment, pod analysis, and general work associated with gasoline plant operation.
LOCATION: Southeast Texas, Gulf Coast area.
HOUSING: Available in immediate area.
SALARY: In line with responsibilities.

Box C-775, The Oil and Gas Journal, Tulsa, Oklahoma

FOR SALE — NEW PIPE

42,286′ of 2⅞", O.D., 6.40#, seamless tubing, externally upset, 28′ lengths, T&C, Reasonably priced, f.o.b., Ft. Worth, Texas.
13,000′ of 2⅜", O.D., 4.60#, National Tube, regular seamless tubing, Range 2, T&C, at $.66 per foot, f.o.b., Canton, Ohio.
9,500′ of 4½", O.D., 10.88#, T&C, Line Pipe, at $1.10 per foot, f.o.b., Crooksville, Ohio.
25,000′ of 5½", O.D., 14#, J-55, Range 2, seamless casing, at $2.20 per foot, f.o.b. Salem, Illinois.
100,000′ of 5½", O.D., 14#, J-55, Range 2, seamless casing, at $2.20 per foot, f.o.b., Oklahoma City, Oklahoma.
5,100′ of 5½", O.D., 17#, J-55, Range 2, seamless casing, at $2.95 per foot, f.o.b., Corpus Christi, Texas.
5,038′ of 5½", O.D., 15.5#, Range 2, J-55, seamless casing, at $2.48 per foot, f.o.b. Pittsburgh, Pa.
2,000′ of 8⅝", O.D., 24#, Range 1, J-55, seamless casing, at $2.75 per foot, f.o.b., Canton, Ohio.
13,000′ of 24", O.D., ⅜" wall, 94.61#, 650# test, line pipe, at $198.00 per ton, f.o.b., Houston, Texas.

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COMPLETE GAS GENERATING PLANTS
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AVAILABLE IMMEDIATELY—ENTIRE UNITS OR PARTS

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During the next several months we will increase our Engineering Organization engaged in the design of Oil Refinery Plants and Power Plants. Location Cleveland, Ohio. The men we need should be qualified as draftsmen, designers, checkers or in higher engineering skills on design of piping, instrumentation, pressure vessels, structural steel, concrete, mechanical or electrical. For presenting your qualifications and prompt consideration, write to us for application form.

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HELP WANTED

ENGINEER: Midwest independent operating four refineries producing light oils, lubes, waxes and asphalts requires engineer with a minimum of 10 years refinery process and engineering design. Should be capable of carrying projects from economic study through process calculation, equipment design, and operating technique. Future for right man excellent. Give full particulars in first letter. Replies held confidential. Box C-787, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST experienced in Rocky Mountain area, by independent producer. Give record of employment. Unusual opportunity for capable man. Liberal salary and expenses, also bonuses. Answers held confidential. Address Box C-769, The Oil and Gas Journal, Tulsa, Oklahoma.

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Graduate engineer experienced in all types of oil field corrosion to take charge of field corrosion problems and research work. Under 40 years of age.

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Experienced reservoir engineers including specialist in secondary recovery problems on both water and gas.

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Man experienced in wire line work to operate bottom-hole sampling truck and perform some related laboratory work.

In reply state experience, education and salary expected.

CONTINENTAL OIL COMPANY
Personnel Division, Ponca City, Okla.

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OPERATING SUPERVISOR
For
Tonnage Oxygen Plant

Opportunity in new industry for a man with practical experience in industrial oxygen plants.

Write stating experience, age, education and salary required.

Address:

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70 Pine Street
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SITUATIONS WANTED

CHEMICAL Engineer: 8 years general refinery or related engineering experience includes construction, design, trouble shooting, and supervision. Desires responsible position in natural gasoline field or refinery. References. Box C-799, The Oil and Gas Journal, Tulsa, Oklahoma.

PRODUCTION Superintendent with 26 years' experience desires oil production job, domestic or foreign. References. Box C-794, The Oil and Gas Journal, Tulsa, Oklahoma.

PROCESS ENGINEER: Degree. 4 yrs. experience process engineering and design. Highest personal and professional qualifications. Thoroughly faciliar catalytic cracking, vapor recovery, topping operations. Desire connection progressive refiner west or southwest. Available reasonable notice. Age 27, married, references. Box C-776, The Oil and Gas Journal, Tulsa, Oklahoma.

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SITUATIONS WANTED

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GRADUATE Mechanical Engineer, age 29, five years plant engineering and maintenance. Boiler plant experience, also pumps, compressors, and large gas engines. Seeks position in refinery or gasoline plant. Write: Box C-798, The Oil and Gas Journal, Tulsa, Oklahoma.

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We are interested in handling all exports for a well established oil refinery. We have our own offices abroad and our experience dates back twenty-five years.

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The Oil and Gas Journal
Tulsa, Oklahoma

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1949 EXECUTIVES MAP OF PERMIAN BASIN

showing sections, surveys, towns, oilwells, drilling wells, dry holes, field names, depths, producing horizons, discovery dates, larger lease blocks, in three colors. Size 3 x 4 ft.

Price $10.00

Descriptive illustrated folder on request.

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Fort Worth 2, Texas

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WE have some good drilling blocks, close in leases to good production. Will take small override, in Clinton County oil field. John A. Damron, Albany, Kentucky.

DRILLER wants someone to take small financial interest drilling some shallow wells. Those not in position to gamble not wanted. Property merits inspection and consideration. Box C-785, The Oil and Gas Journal, Tulsa, Okla.

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Have several small oil wells ready to pump. Average depth 600 feet. Want to buy tubing rods and single well pumping units. Will assign three-quarters of oil sales from each well in payment for above equipment. Box C-797, The Oil and Gas Journal, Tulsa, Oklahoma.

OIL LEASES for sale in large, small or medium size blocks in Colorado, Wyoming, New Mexico, Montana, Arizona. Wholesale or retail. Write for descriptive list. Dyer-OJ, 1835 Champa, Denver, Colorado.

SPRING just around the corner and I have several leases in shallow oil area which I am confident will produce oil. Will make farmouts or join you in drilling. You cannot afford NOT to inspect these properties if you are in the oil business or want to prospect where you can afford it. Box C-795, The Oil and Gas Journal, Tulsa, Okla.

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PRODUCING OR NONPRODUCING

Texas, New Mexico, Oklahoma, Louisiana and Illinois

Inquiries Invited

B. D. BUCKLEY

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ALUMINUM PAINT—400 5-gallon cans, 480 quarts—Exterior Gilsonite Base, Highly Polished Pure Aluminum Pigment. Waterproof, ideal for tanks, roofs, buildings, equipment. Covers 300 to 400 square feet to the gallon. Distributors Liquidation. Regular price $6.95 gallon. Take any part—$10.00 for 5 gallons, $7 for 12 quarts. Send Check With Order. The National, 606 Walnut, Kansas City, Mo.

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26-foot steelcraft cruiser, demonstrator with twin 115 HP Chrysler engines 90 hours running time, ship to shore radio telephone and other improvements over standard model, speed 20 MPH, completely refinished and in new condition. Can be inspected any time at Gulfport Shipbuilding & Drydock Corp., Port Arthur, Texas, agents for Steelcraft Cruisers, Phone 26486.

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Fresno, Kern, Riverside—**$2.50 - $5.**

Los Angeles—**$1 and $3.**

Siskiyou—**$2 and $4.**

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Recent strikes have focused attention on Montana's deeper oil zones and major companies are moving fast, drilling and leasing. We buy direct in the field, sell direct to our customers. Write LANDOWNERS ROYALTIES COMPANY, Box 1225, Great Falls, Montana.

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WAREHOUSE space in Wichita Falls, Texas. Prefer tenant handling oil field specialties. Attractive new building on main highway. Convenient to oil field supply companies. If interested communicate with Larkin Packer Company, 1502 Maury Street, Houston, Texas.

CALENDAR

February

American Petroleum Institute Lubrication Committee meeting, Jefferson Hotel, St. Louis, Mo., February 21-23.

American Society for Testing Materials, spring meeting and A.S.T.M. committee week, Hotel Edgewater Beach, Chicago, Ill., February 28-March 4.

March

American Institute of Chemical Engineers, regional meeting, Biltmore Hotel, Los Angeles, March 6-9.

American Petroleum Institute, Southwestern district, Galvez Hotel, Galveston, Tex., March 9-11.

American Association of Petroleum Geologists, regional meeting; Society of Exploration Geophysicists, and Society of Economic Paleontologists and Mineralogists, Jefferson Hotel, St. Louis, Mo., March 14-17.

American Petroleum Institute, division of production, Mid-Continent district meeting, Mayo Hotel, Tulsa, March 23-25.

New England Gas Association, Hotel Statler, Boston, March 24-25.

Illinois Oil and Gas Association, annual meeting, Hotel Emmerson, Mount Vernon, Ill., March 25.

Western Petroleum Refiners Association, thirty-seventh annual meeting, Plaza Hotel, San Antonio, Tex., March 28-30.

American Chemical Society, division of petroleum chemistry, spring meeting, San Francisco, March 27-April 1.

April

Texas Independent Producers and Royalty Owners Association, Houston, April 1.

American Petroleum Institute, division of refining, mid-year meeting, Shamrock Hotel, Houston, April 4-7.

American Society of Lubrication Engineers, annual meeting, Pennsylvania Hotel, New York, April 11-13.

National Association of Corrosion Engineers, annual convention, Netherlands Plaza Hotel, Cincinnati, Ohio, April 11-14.

Southwestern Gas Measurement Short Course, University of Oklahoma, College of Engineering, Norman, Okla., April 12-14.

National Petroleum Association, Hotel Cleveland, Cleveland, Ohio, April 13-15.

Natural Gasoline Association of America, annual meeting, Texas Hotel, Fort Worth, April 20-22.

Southern Gas Association, annual convention, Buena Vista Hotel, Biloxi, Miss., April 20-22.

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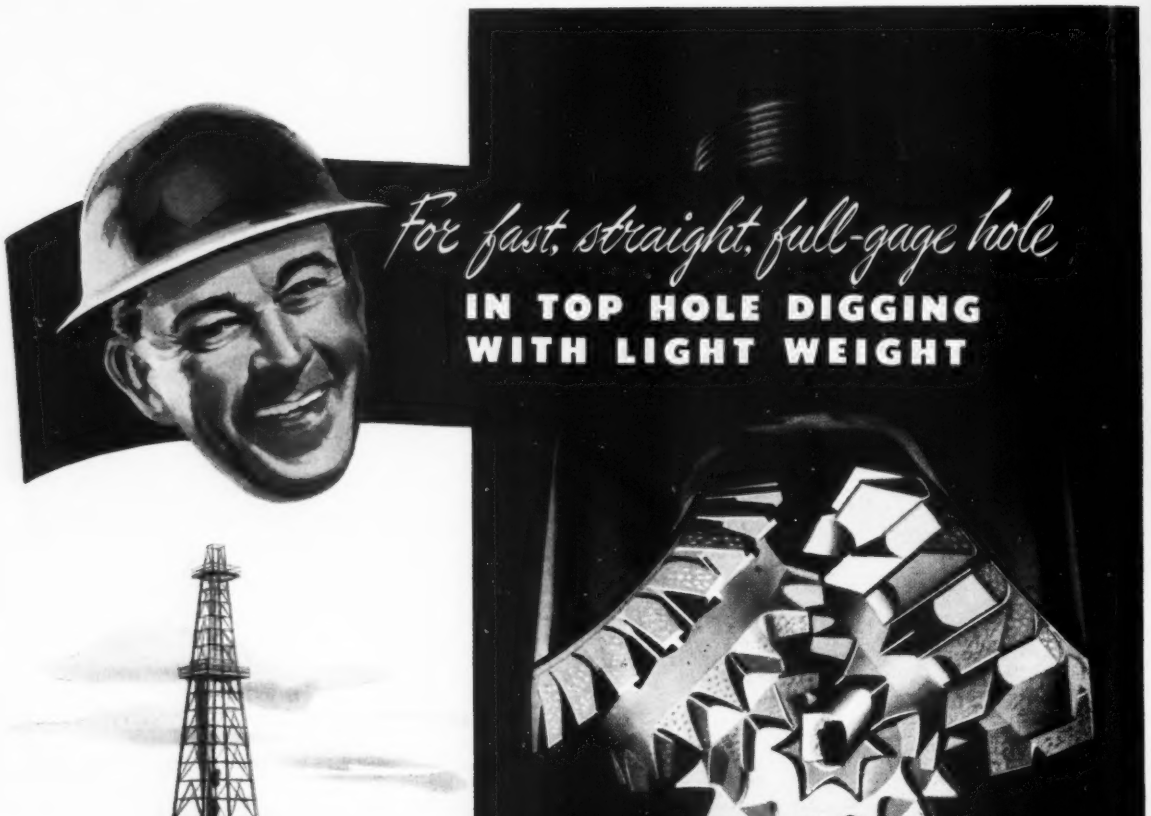

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